S. J. Sedgwick Esq

From the American Institute

Feb 16 1861

TRANSACTIONS

OF THE

AMERICAN INSTITUTE,

OF THE

CITY OF NEW YORK,

FOR THE YEARS

1859-60.

ALBANY:
C. VAN BENTHUYSEN, PRINTER.
1860.

Transport Transfer to S. S. Stacks 1-12-70

STATE OF NEW YORK.

No. 191.

IN ASSEMBLY, MAR. 14, 1860.

TRANSACTIONS OF THE AMERICAN INSTITUTE.

To Hon. D. W. C. Littlejohn,
Speaker of the Assembly:

Sir—I herewith transmit the Annual Report of the American Institute of the city of New York, for the year 1859.

I have the honor to be,
Very respectfully,
Your obedient servant,
THOMAS McELRATH,
Corresponding Secretary.

American Institute,
New York, *March* 12, 1860.

AMERICAN INSTITUTE.

Trustees and Committees.

1859.

President.—JAMES RENWICK.

Vice-Presidents.—WILLIAM HALL, BENJAMIN AYCRIGG, JOHN A. BUNTING.

Recording Secretary.—HENRY MEIGS.

Corresponding Secretary and Agent.—WILLIAM B. LEONARD.

Treasurer.—JOHN GRAY.

Finance Committee.—B. Lewis, Jr., John M. Reed, S. R. Comstock, Peter H. Titus, B. J. Hathaway.

Managers of the Fair.—D. R. Jaques, William Ebbitt, James R. Smith, John V. Brower, William H. Butler, Isaac M. Phyfe, John Johnson, William Close, Thomas W. Field, James C. Baldwin, Charles A. Whitney, F. W. Geissenhainer, Jr., Robert Marshall, Archibald Johnston, Thomas F. De Voe, Samuel H. Maynard, George Peyton, Zachary Peck, John C. Johnson, Alfred Bridgeman, Thomas Williams, Jr., D. M. Reese, Geo. Timpson, B. Lewis, Jr., John F. Conrey.

Committee on Agriculture.—Nicholas Wyckoff, William Lawton, John P. Veeder, A. P. Cumings, George E. Waring, Jr.

Committee on Commerce.—Luther B. Wyman, W. W. Dibblee, Wm. H. Slocum, Ridley Watts, Rush Patterson.

Committee on Manufactures, Science, and Art.—John D. Ward, S. D. Tillman, Joseph P. Pirsson, Mendes Cohen, Alex. H. Everitt.

Committee on the admission of Members.—Robert Lovett, Hiram Dixen, James F. Hall, John W. Chambers, Henry Meigs.

Committee on Correspondence.—Robert Lovett, Hiram Dixon, Elial F. Hall, Clarkson Crolius, Geo. F. Barnard.

Committee on the Library.—William Hibbard, D. Meredith Reese, D. R. Jaques, William Lawton, Wm. H. Browne.

Committee on Repository.—Martin E. Thompson, James Bogardus, John Johnson, Edward Walker, Henry Fits.

Clerk and Secretary of the Trustees.—John W. Chambers.

Librarian.—Ezekiel A. Harris.

Messenger.—William C. Miller.

1860.

President.—WILLIAM HALL.

Vice-Presidents.—JOHN A. BUNTING, JOHN GRAY, DUDLEY S. GREGORY.

Recording Secretary.—HENRY MEIGS.

Corresponding Secretary and Agent.—THOMAS McELRATH.

Treasurer.—BENEDICT LEWIS, Jr.

Finance Committee.—S. R. Comstock, P. H. Titus, Chas. A. Whitney, John M. Reed, George F. Nesbitt.

Managers of the Fair.—James C. Baldwin, Thos. F. De Voe, Wm. H. Butler, Wm. Ebbitt, Alfred Bridgeman, John V. Brower, Thos. W. Field, George Timpson, John Johnson, Thos. Williams, Jr., Wm. H. Slocum, John W. Avery, Edwin Smith, John B. Peek, T. F. Engelbrecht, Wm. D. Andrews, Cyrus Mason, S. R. Wells, Wm. S. Carpenter, Alex. Holland, O. Cleveland, George Peyton, Harvey Hart, James Y. Watkins.

Committee on Agriculture.—A. P. Cumings, Simeon Leland, Nicholas Wyckoff, Charles A. Stetson, Adrian Bergen.

Committee on Commerce.—Luther B. Wyman, Rush Patterson, N. B. Mountfort, Wm. K. Strong, Wm. Cotheal.

Committee on Manufactures, Science, and Art.—James Renwick, Edward W. Serrell, John D. Ward, Benj. Aycrigg, Benj. Garvey.

Committee on the admission of Members.—Robert Lovett, James F. Hall, Henry Meigs, Jno. W. Chambers, Wm. H. Beebe.

Committee on Correspondence.—John H. White, Hiram Dixon, Henry L. Stuart, Clarkson Crolius, George F. Barnard.

Committee on the Library.—Wm. Hibbard, Lewis A. Sayre, Edward Walker, Jno. W. C. Leveridge, Charles A. Seely.

Committee on Repository.—Martin E. Thompson, James Bogardus, Wm. Close, J. K. Fisher, T. D. Stetson.

Clerk and Secretary of the Trustees.—John W. Chambers.

Librarian.—John W. Chambers.

Messenger.—William C. Miller.

EIGHTEENTH ANNUAL REPORT

OF THE TRUSTEES OF THE AMERICAN INSTITUTE.

The undersigned, Trustees of the American Institute, in conformity with the Law of May 5, 1841, respectfully report the acts of the Institute for the year 1859:

One of the first acts of the Institute was the arrangement made to lease the property No. 351 Broadway, for three years from the 1st of May, 1859, being the longest time allowed by the by-laws; the gross amount obtained for these premises was the sum of eleven thousand dollars per annum. In order to obtain accommodations for the business of the Institute, the library, reading rooms, etc., a lease for the same period of three years was secured from the "Board of Control" of the "Cooper Union," comprising the rooms No's 21, 22, 23, with the occasional use of No. 24, at a rental of seventeen hundred and fifty dollars per annum. By this arrangement, the Trustees hope to realize a gain of $5,750 per annum for the benefit of the Institute.

The sad loss by fire at the Crystal Palace, occasioned great disappointment to exhibiters, who desired an opportunity of duplicating their articles on exhibition and destroyed at the Thirtieth Annual Fair, and in accordance with the obligation due them, the Institute felt especially bound to hold a Fair, even with the knowledge that an exhibition would entail on them an additional loss.

The Trustees and Board of Managers secured, as the only feasible place, the "Palace Garden," near the Sixth avenue, between Fourteenth and Fifteenth streets, where the Fair was held from the 21st of September to the 5th of November. The space occupied covered about 200 feet square, on which was erected sheds and tents, to protect the articles from the weather. These premises, however, proved inadequate for the proper display of the numerous articles offered for exhibition, and left little room for the crowd who daily thronged the Garden, consequently the receipts fell far short of those of previous fairs.

The Board of Agriculture, in connection with the New York Horticultural Society, held an exhibition at Hamilton Park, with extensive arrangements of grounds for stock and farming implements, together with the use of large halls in the Third Avenue railroad depot, in which were displayed the most beautiful show of fruits and flowers ever exhibited in New York. The use of four acres at Harlem was secured, for the operation of "Fawkes' steam plow," which had attracted general interest throughout the country. The plow, having been detained on the road from Chicago, arrived in New York too late to be exhibited, and too late to be of that benefit to the Institute, which was anticipated.

With all these favorable arrangements, we were warranted in anticipating a successful exhibition; but a severe rain storm, commencing at the opening, and continuing with great violence during the three days of the fair, prevented visitors from attending, and consequently the anticipated results were not realized.

We are sorry to say, that the operations for the Thirty-first Annual Fair has resulted in a heavy loss to the Institute, though we trust the public will be benefited by the information diffused through all branches of society, connected with the great improvements of the day.

The Board of Trustees deem it their duty to urge upon the people of the State of New York, and particularly upon the inhabitants of this metropolis, where their business is located, the claims which they have to national, State, and municipal patronage. Driven from Castle Garden by the Board of Emigration, and from the "Crystal Palace" by fire, they are now without a suitable place in which to hold the annual exhibitions. There are grounds in this city unappropriated to any specific purpose, on which such a building as the American Institute could erect, would be an ornament to the city, and to whose neighborhood the influx of so reputable a class of visitors as frequent the fairs, would be a benefit, as it would be to all branches of trade in the city, as well as to the public conveyances leading to and from New York. While national, State, and county societies are so rapidly multiplying for similar objects, we trust the American Institute will find a helping hand from our State Legislature and city government, to establish a repository in the city of New York, from which the tide of improvements may flow into channels of usefulness to the agriculturists and manufacturers, and to the arts and sciences.

JAS. RENWICK,
WM. HALL,
H. MEIGS,
B. AYCRIGG,
JOHN A. BUNTING,
W. B. LEONARD, *Trustees.*

FINANCES.

The following is the financial condition of the American Institute, on the 1st day of February, 1860:

Balance in the treasury February 1, 1859,			$118 05

RECEIPTS.

The receipts of the past year have been:

From rent of premises No. 351 Broadway, Nov. 1, 1858, to Nov. 1, 1859,		$7,233 77	
From admission fees and annual dues from members,		2,080 00	
From certificates of award,		24 00	
From sales of Transactions,		3 00	
From library—fines and duplicate volumes sold,		24 84	
From sales of old papers and pamphlets,		259 82	
do boilers, iron, &c.,		582 74	
From notes discounted by Butchers' and Drovers' Bank,	$7,200 00		
Less interest,	113 22	7,086 78	
From Treasurer of the State of New York, under act of May, 1841, for "1858,"		950 00	
From bond and mortgage, premises No. 351 Broadway,		16,000 00	
From duplicate silver medal,		5 00	
From water tax,		18 00	
From managers of the Thirty-first Annual Fair (balance),		3 74	
			34,271 69
Am't to be accounted for, including last year's balance,			$34,389 74

EXPENDITURES.

Real estate.			
Bond and mortgage, held by Wm. B. Astor, and others, due May 1, 1859,	$13,000 00		
Interest,	665 17		
Insurance,	79 36		
Taxes, 1859,	1,092 02		
Repairs (351 Broadway and 89½ Leonard street),	868 99		
Searching title of do.,	75 00		
		$15,780 54	
Bills payable.			
Notes discounted,	$6,200 00		
Interest,	32 26		
		6,232 26	
Library.			
Books,	$206 78		
Carried forward,	$	$	$

Brought forward,	$	$	$
Periodicals,	109 50		
Map,	6 00		
Binding,	74 50		
Subscription to newspapers,	65 54		
Advertising library,	51 54		
		513 86	
Crystal Palace.			
Costs and expenses of suit, Innes vs. Am. Institute,		164 90	
On account of 29th Annual Fair.			
Restriking medals,		5 00	
On account of 30th Annual Fair.			
Printing and advertising,	$87 54		
Use of steam pumps,	42 50		
Use of settees,	25 00		
Oil for machinery,	5 40		
Truck,	5 50		
Case for premiums,	46 00		
Premiums, cash,	33 50		
do medals and silver-ware,	59 83		
		305 27	
On account of the 31st Annual Fair.			
Agents' expenses,	$26 57		
Appropriation per vote of American Institute,	3,300 00		
		3,326 57	
Miscellaneous bills.			
Rent of rooms in Cooper Union,	$875 00		
Expenses of removing and fitting up rooms for library and offices,	786 19		
Matting for floor,	43 55		
Repairs of safe and chairs,	16 00		
Insurance on library,	33 05		
do other property,	9 50		
Printing,	107 95		
Stationery,	84 54		
Advertising,	68 23		
Testing boilers, and preparing them for sale,	30 13		
Fuel and light,	97 97		
Agent's expenses at Albany,	15 00		
Ice,	11 25		
Labor,	15 00		
Carried forward,	$	$	$

Brought forward, ...	$	$	$
Petty cash expenses: Advertising meetings of Farmers' and Polytechnic Club, subscription to papers, cleaning, postage, &c., &c., ...	268 43		
		2,461 79	
Salaries.			
Corresponding sec'ry and agent,	$1,500 00		
Recording secretary, ...	1,000 00		
Clerk (including $175 arrears),	1,675 00		
Librarian (inc'd'g $100 arrears),	1,033 33		
Messenger, ...	184 00		
		5,392 33	
			34,182 52
Balance in the treasury February 1, 1860, ...			$207 22

AMOUNT OF PROPERTY HELD BY THE AMERICAN INSTITUTE JANUARY 31, 1860.

Real estate, 351 Broadway, cost......	$45,000 00	
89½ Leonard street, ...	800 00	
	$45,800 00	
Less mortgage, ...	16,000 00	
		$29,800 00
Library and fixtures, per last report, January 31, 1859, ...	$12,651 03	
Added by purchase of books and binding, during the year, ...	396 78	
	$13,047 81	
Less duplicate volumes sold, ...	14 75	
		13,033 06
Office furniture, safes, &c., ...		307 26
Property stored at No. 109 East 18th, and No. 399 West street, valued at.....................		1,300 00
Medals and cups on hand, ...		460 36
		$44,900 68
Cash in treasury January 31, 1860, ...		207 22
Total, ...		$45,107 90

BENEDICT LEWIS, Jr.,
S. R. COMSTOCK,
JOHN M. REED,
BAILEY J. HATHAWAY,
P. H. TITUS,
Finance Committee.

ANNUAL REPORT

OF THE LIBRARY COMMITTEE OF THE AMERICAN INSTITUTE.

In conformity with section 47, of the by-laws, wherein it is made the duty of the library committee to render to the Institute, at the stated meeting preceding the annual election, a full report of its doings, the library committee very respectfully submit the following report:

The library committee have been duly sensible of the growing interest that the members of the Institute have manifested in the growth and development of the library, and of the importance attached to it as a leading feature of the Institute, and in reviewing their acts for the past year, have the assurance that, although its development has not been as great as it would have been had the Institute not sustained such heavy pecuniary losses as occurred last year through the destruction of the Crystal Palace, and this year through the exhibitions at Palace Garden and Hamilton Park; still much progress, it will be seen, has been made, and many important and valuable additions secured.

The library contained, at the date of our last annual report, eight thousand two hundred and sixteen (8,216) volumes, and there have been since added two hundred and fifty-two (252) volumes, making the total number now in the library eight thousand four hundred and sixty-eight (8,468).

The additions made to the library during the year, have been obtained as follows:

By purchase,	70	volumes.
subscription,	35	do
presentation,	113	do
exchange,	1	do
pamphlets,	33	do
	252	volumes.

Among the works purchased during the year, a list of which is hereto annexed, will be found the following, viz:

Encyclopædia Britannica, eighth edition.
American Cyclopædia.
De La Rive's Electricity.
Faraday's Researches.
Weale's Public Works of Great Britain.

Among the works presented, a list of which is annexed, will be found the works of Emanuel Swedenborg, 15 vols., 8vo., presented by the Swedenborg Printing and Publishing Society; valuable public documents from the Honorable Hamilton Fish, the Honorable Preston King, and the Regents of the University of the State of New York; Transactions and Reports of various agricultural societies, and the principal agricultural periodicals.

At the date of our last annual report, there were 500 volumes of duplicates of works in the library, to be disposed of. The committee have succeeded in disposing of some by exchange, and of some by private sale. The sum of $14.75 has been so received, and paid over by the librarian to the treasurer of the Institute.

Of the 1,000 copies of the Catalogue originally printed, only 50 copies are now remaining in sheets; of the Supplement, there are 400 copies. The Supplement was issued in 1857, since which time many important additions to the library have been made. The committee propose, as soon as the financial condition of the Institute will admit of it, to make further valuable additions, and issue another Supplement, or an entirely new Catalogue.

During the past year, there has been expended for books and binding as follows, viz:

For purchases,	$217 41
binding,	74 50
	$291 91

Of the appropriation made by the Institute in 1851, for the

purchase of books,	$2,500 00
There has been expended,	2,199 46
Leaving the sum of	$300 54

still unexpended, and at the disposal of the committee for additional purchases.

In conclusion, your committee would remark, that while they have had the growth of the library constantly in view, and have felt a deep solicitude for its speedy development, still the interests of the Institute have always been paramount, and that the committee have exercised the necessary economy is proved by the fact that the appropriation of $2,500, made by the Institute in 1851, has not yet been exhausted.

Finally, your committee deem it to be but an act of justice for them to attest the faithfulness with which the librarian, Mr. Harris, has performed the duties of his office, and the promptitude and cheerfulness with which he has co-operated with the committee in advancing the interests of the library.

All which is respectfully submitted.

WILLIAM HIBBARD,
D. MEREDITH REESE,
WILLIAM LAWTON,
DAVID R. JAQUES,
WILLIAM H. BROWNE,
WILLIAM B. LEONARD,
Library Committee.

New York, *February* 2, 1860.

LIST OF WORKS PURCHASED.

Muspratt's Chemistry, vol. 5.
Benton's Debates, vols. 10, 11, and 12.
Faraday's Researches in Chemistry, &c.
Swedenborg's Animal Kingdom, 2 vols.
do Principia, 2 vols.
do Generative Organs.
do Compendium.
do Life.
American Stair Builder.
Lesley on Iron Manufacture.
French on Drainage.
Weeds and Useful Plants (Darlington).
Langstroth on the Hive and Honey Bee.
Downing's Landscape Gardening (new edition).
De La Rive's Electricity, 3 vols.
Noad's Electricity, vol. 2.
Mitchell's Assaying.
Useful Metals and their Alloys.
Price's Photographic Manipulations.
Bakewell's Electricity.
Hogg on the Microscope.
Liebig's Modern Agriculture.
Encyclopædia Britannica, 18 vols.
American Cyclopædia, 7 vols.
Vieux Neuf, 2 vols.

Graham's Chemistry.
Greener's Gunnery.
Easton's Street Railways.
Chevreul on Color.
Stephenson on Lighthouse Illumination.
Mulder on Wine.
Feuchtwanger's Treatise on Gems.
Mitchell's Map of the United States.
Banks of New York.
Irving's Washington, vol. 5.
Antisell on Coal Oils.
Life of James Watts.
do George Stephenson.
do Humboldt.

LIST OF WORKS PRESENTED.

Patent Office Report, for 1857, 4 vols. From Hon. J. M. Bernhisel.

Transactions of the N. H. State Agricultural Society, for 1850–'57, 3 sets, 18 vols. From N. H. State Ag. Society.

Reports of Maine Board of Agriculture, for 1856 to 1858, 18 vols., 6 sets. From Maine Board of Agriculture.

Colonial History of New York, vol. 2, 4to., Albany. From Regents of the University.

Catalogue of Books on Bibliography, &c., in the New York State Library. From Regents of the University.

Report of the Railroad Commissioners of New Hampshire, 1858. From N. H. State Agricultural Society.

Reports of the Common Schools of New Hampshire, 1856 to 1858. From N. H. State Agricultural Society.

Report of the Board of Education, 1857. From Dr. William Hibbard.

Report on Commerce and Navigation, 1858. From Hon. J. M. Bernhisel.

Report on the Finances, 1857–'58. From Hon. J. M. Bernhisel.

Report of the Ohio State Board of Agriculture, 1857. From J. H. Klippart, secretary.

Bon Jardinier, 1859. From L. Vilmorin.

Allen's Practical Tourist, 2 vols. From W. B. Leonard.

Wisconsin Farmer, vols. 1, 2, and 3. From D. J. Powers.

Trans. of the Batavian Society of Arts and Sciences, 1854–'57. From Hon. Wm. Burlage.

American Journal of Photography. From Charles A. Seely.
Explorations and Surveys for a Pacific Railroad Route, 2 vols. From Hon. Hamilton Fish.
Espy's Meteorological Report. From Hon. Hamilton Fish.
Report on Commercial Relations. From Hon. Hamilton Fish.
Paine's Institutes of Medicine, 1859. From Martin Paine.
Social and Domestic Religion. From H. Clinton Witt.
Booth's History of the City of New York. From Mary L. Booth.
Report of the Sanitary Convention, 1859. From Sanitary Association.
Trans. of California State Agricultural Society, 1858. From the California State Agricultural Society.
Buel's Treatise on Agriculture. From Robert L. Pell.
Mysteries of Isis. Anonymous.

Swedenborg's	Arcana Celestia, 10 vols.,	From Swedenborg Printing and Publishing Society.
do	Apocalypse Revealed, 2 vols.,	
do	4 Leading Doctrines,	
do	Conjugal Love,	
do	Miscellaneous Works.	

Bache's Coast Survey, 1854 and 1857. From Prof. A. D. Bache.
Working Farmer, 10 vols. From James J. Mapes.
Caird's Travels. From Mr. Caird.
American Annals of the Deaf and Dumb, 4 vols. From Prof. O. W. Morris.
Reports of the Deaf and Dumb Institution, 2 vols. From Prof. O. W. Morris.
Explorations and Surveys for a Pacific Railroad Route, 4 vols. From Hon. Preston King.
Commercial Relations of the United States, 2 vols. From Hon. Preston King.

AGRICULTURAL PERIODICALS,

CONTRIBUTED BY THEIR PUBLISHERS.

American Agriculturist, New York, N. Y.
American Stock Journal, New York, N. Y.
California Culturist, San Francisco, Cal.
California Farmer, San Francisco, Cal.
Emery's Prairie Farmer, Chicago, Ill.
Genesee Farmer, Rochester, N. Y.
Michigan Farmer, Detroit, Mich.
N. W. Prairie Farmer, Chicago, Ill.
N. W. Farmer, Chicago, Ill.
N. Carolina Planter, Raleigh, N. C.
Rural American, Utica, N. Y.
Southern Homestead, Nashville, Tenn.
Southern Planter, Richmond, Va.
Southern Rural Magazine, Montgomery, Ala.
Wisconsin Farmer, Madison, Wis.
Working Farmer, New York, N. Y.
Farmer's Advocate, Chicago, Ill.

REPORTS OF COMMITTEE ON MANUFACTURES, ARTS, AND SCIENCES.

Bullet Moulds.—Henry L. De Zeng's.

The committee on manufactures, arts, and sciences, to whom was referred for examination, the bullet moulds exhibited by Mr. Henry L. De Zeng, have to report:

That the moulds presented for their inspection (which were fitted for making pointed or Minnie balls) were ingeniously designed, well executed, and appeared fitted to produce bullets more rapidly than any other form of moulds which has come under their notice.

The committee did not see the apparatus in use, but are of opinion that, unless it is important that bullets should be perfectly homogeneous, or that the metal of which they are made be of equal density in every part, this form of moulds will be found a useful improvement.

Respectfully submitted,

JOHN D. WARD,
MENDES COHEN,
SAM'L D. TILLMAN,
JOSEPH P. PIRSSON,
Committee.

New York, *November* 21, 1859.

Friction Bush.—William Allender's.

The committee on manufactures, arts, and sciences, to whom was referred for examination an anti-friction bush, exhibited by Mr. Wm. Allender, have to report:

That the principal peculiarity which distinguishes the specimen exhibited from others of the same class, consists in the introduction between the rollers of their springs of sheet brass, fitted to, and embracing such portions of their circumference as is supposed sufficient to retain them in their proper places while at work, instead of small pivots and rings, at the ends of the rollers, which have heretofore been used for that purpose.

How much this change may be found to improve the working, and increase the durability of the apparatus, the committee are unable to decide, and decline expressing an opinion thereon until further use has demonstrated its advantages.

The form of the case, or ring, which receives the rollers, will admit its being fitted into solid sheaves in ship blocks, instead of having to divide them in the centre of their thickness, and afterwards rivet them together, as is necessary when those of the old form are used. This, if the bush is equal in other respects, will be an advantage, as solid sheaves are at the same time stronger and cheaper than those made up of parts riveted together; and bushes of this form may also be easily replaced when worn or injured.

Respectfully submitted,

JOHN D WARD,
MENDES COHEN,
SAMUEL D. TILLMAN,
JOSEPH P. PIRSSON,
Committee.

NEW YORK, *November* 22, 1859.

OPENING ADDRESS,

AT THE THIRTY-FIRST ANNUAL FAIR OF THE AMERICAN INSTITUTE, AT PALACE GARDEN, SEPTEMBER 28, 1859,

By Henry Meigs, *Recording Secretary.*

Ladies and Gentlemen—The American Institute again calls me to the agreeable duty of opening to you the Thirty-first Annual Fair.

They have gathered here the works and fruits of our home genius and industry, in every branch of our great and busy country—all of the last year's production. Here they are, forming the triumph which we dearly love. These act as so many powerful stimulants to more invention, more labor to improve all, and surpass all other nations. In this remarkable age, we are taking the lead in splendid style. Our national cry is, *Go ahead!* I, for one, have for years cried, Ay! but for all sakes, *Look ahead too!*

The Managers' work of preparation, including thousands of admirable works which cannot bear exposure to bad weather, has been unavoidably delayed by the storms. Yet no American lives who does not submit with all humility to the dispensations of God. Armies, navies, and nations, have been at the mercy of like storms. Our ancestors always manifested religious patience; their motto was, however, in the darkest hours of the storm, in Latin, "*Serenabit*"—*it will clear up!*

In making up a history of the Transactions of the Institute for the year, we include notices of all the new and valuable articles, gathered from the world; we have them this year from England, France, Russia, Austria, Hungary, Belgium, Java, Brazil, China, Hindostan, South America, Mexico, and our Pacific States, California, and from Canada. With all these, we exchange our volumes of Transactions for theirs, free of expense. The Plenipotentiaries of England, the Lords Napier and Lyons, recently gratuitously gave us the facilities for investigation in India, for investigation of the common schools of Hindostan, ancient and modern.

About twelve years ago, some of the best of our philosophic mechanics considered the question of such an enlargement of our ocean vessels as would enable them to cover several of the largest waves, be provided with several adequate engines, &c. The subject continued some days; and the theory was maintained that such an enormous vessel, say *one thousand feet long*, might be constructed, *as in nature, cellular*, so that adequate strength can be obtained by iron, together with *perfect safety from fire and foundering*. But, as the idea was new, and demanded great caution, we decided not to lay it before the world. We, however, had an English engineer about us, who, we said, will send these hints to England, from whence we expected to hear, by the next arrival, of its being *duly invented there*, as many a *Yankee notion* is.

We have hoped that they would succeed. The Great Eastern seems to promise success. Let her come! our Long Island Sound, East river, Hudson river for two hundred miles, can float her, from *Montauk point to our city of Hudson, one hundred miles above New York, a harbor unequalled upon earth!*

But, if England and the world fail in making such ships, *we shall not fail!*

The first successful master of the fierce Atlantic will be the American mammoth ship from New York, the London of the west, the centre of the New World now, soon to be the *commercial centre of the whole world.*

You see here, ladies and gentlemen, American work, of which much is of surpassing beauty and utility. May I invite you first, to the tailor's sword, his shears; see them, of sparkling, dazzling silver hilts and gleaming steel blades! No Emperor's sceptre was ever more resplendent! Do you know that London and Paris have not been able to cut themselves into fashion, without our Yankee shears? Even so: we shear them still. Once the tailor was but the ninth part of a man; now he is *nine men to one*, for without him, what are we? Even so with the ancient farm workman, the *villain*, the *boor*, the *bog-trotter*, who was despised by the velvet-handed aristocracy, who saw him delving with wretched rusty iron tools. How now? Like the tailor, he has risen to rank; his spade, plow, scythe, axe, all glitter with polish. Emperors and ladies smile courteously upon him; genius works for him; science labors for him; schools, colleges, universities, teach him and praise him; chemists labor in their laboratories for him. In old times the alchemists labored for life in the vain effort to transmute base metals into gold; now see them all laboring to transmute all base refuse material into *corn, wine, and oil.*

Our swords are polished too, but they are not needed for war; we do as much as possible to beat our swords into plowshares, but we keep their brightness too, while other *peoples* (as Kossuth calls 'em) let *both swords and souls rust ingloriously.* We found out some time ago that the brilliant implements of labor which did double work, were honorable to the worker. No people ever yet polished all its implements of hard work as we do.

See a revolution in plowing, unexampled on earth. See Fawkes, of Pennsylvania, with his Farm Mammoth, his steam plow, turning up *eight furrows*, at the rate of four miles an hour! thus preparing our ground for the seed when we want it. Now, not lounging lazily with a *bull plow and a boor* at its tail, an acre a day of shallow work. And when Fawkes has no plowing to do, he is a steam mill of fifty-six horse power, sawing, grinding, pumping, churning, washing, irrigating, for he throws a shower of water a hundred feet if necessary. And if all this is not enough, some American will soon beat it by a land-forker and pulverizer! Truly, honest labor is looking up; a few days ago Eugenie, Empress of forty millions, gave the *Cross of the Legion of Honor to a gardener.*

Some two years ago our Mechanics' Club had the world telegram under consideration, and while the Ocean line was contemplated, deemed it better to carry wires as much as possible by land, because the lines are very liable to damage, and cannot long bear the action of the electricity—the *road*, like all others, will *wear out.* We therefore recommended to the Czar of Russia, to conduct wires across Behring's Straits, where Asia and America can see one another from the Diomedes island—Ratmanoff and Krusenstern in the middle, and where the water is only two hundred feet deep, and where the current from the Pacific sets constantly through to the north, so that no iceberg can come down from the Arctic ocean through it; where thousands of wires may be laid and taken up for repairs, so that all men may ask all around the world for a cheap price, *how trade goes*, and *friends are!* We drew an enlarged chart of that Strait, which has been hanging on our walls more than two years past, showing exactly the telegram position.

The little I have said forms but an index to that you will see and say. In behalf of our Institute, I now bid you all a hearty welcome.

ANNIVERSARY ADDRESS,

BEFORE THE AMERICAN INSTITUTE, AT PALACE GARDEN, OCT. 29, 1859,

BY THE HON. A. OAKEY HALL.

"Daily wonders of life in the world of industry."

The Statutes of 1829, a small volume, compared with the last one, of encyclopædia bulk, contains the charter of the American Institute. Its first fair was held in Masonic Hall: that now only lives in the Manual of Mr. Valentine. The present one was crowded up to "Palace Gardens," which, in 1829, were pasturage grounds, and whose soil, very soon, will be pressed by massive masonry.

How the multiplication of the State statutes—how the extending city—how the chasm of time between 'fair' the first and 'fair' the last (a chasm spanned by the beautiful and enduring bridge of progress)—how eloquently they tell what has been accomplished during the thirty-one years of the American Institute.

That is no great lapse of time, observed alone by pendulum measurement. But, noted by the hour-hand of eventful improvement, the thirty-one years equal any five centuries since the epochs wherein oriental art and science were entombed beneath Egypt's sands, or beside the Archipelago's silver strand. Aye, the American Institute is aged with success of innumerable inventions; and yet its eldest member, in his elasticity of step, may challenge the envy of the youngest club-lounger!

A classical account has the Institute to render. It has nobly maintained its object. Says the charter: "For the purpose of encouraging and promoting domestic industry in this State, and in the United States, in agriculture, commerce, manufactures, and the arts, and any improvements made therein, by bestowing rewards and other benefits upon those who shall make any such improvements, or excel in any of the said branches."

And the 'Institute' takes no note of time by its loss. In this age all 'losses' of merely sped years, produce the 'profits' of the trackless future.

But little older than the Institute, I feel exceedingly embarrassed in your presence; especially so, when I recall the commanding form and potent voice of him who stood before you a few anniversaries ago, to eulogize the results of labor and invention—himself a mechanic-boy, and now Governor of a State whose roll of inventors is so golden—of that State whose proclamations end, 'God bless the *Commonwealth* of Massachusetts!' to which all the people cry '*Amen!*' Or when I remember my brother Brady, whose Celtic wit and Saxon logic so appropriately illustrated here, the footpath of art. Or when I recollect the apt sentences before you of Bache; or when I bring to mind another discourse in your Transactions, a few years ago, of which Halleck, from his 'Fanny,' shall be my interpreter:

> The leaves of autumn smile, when fading fast,
> "The swan's last song is sweetest, and the best
> Of Macos' speeches doubtless was his last!"

I therefore crave your indulgence whilst you, perhaps, think that the representative of a profession whose philosophy, it is said, has retrograded, comes to burn faint incense in the great temple of art and science, before the altars of mechanics and manufactures, which are so much enriched by the votive offerings of enthusiastic rhetoric and sympathetic oratory.

II. Shall we group ourselves, during a few moments, around the first milestone of the Institute, for a brief survey of its 'then landscape,' of its surroundings and associations in this city?

American Industry, in 1829, was but a sapling. The domains of agriculture extended in disorder; mechanics and laborers, in their humble homes, were hopeful, rather than achieving. In the furrow and in the workshop waited students, but the Professors had not met to inaugurate a proper university. Three cities were in the race for position—one with the prestige of learning, one with the *morale* of stability and patience; but the third, New York, directing the attention of Boston and Philadelphia to majestic advantages of locality, which framed a gateway of the west. Her citizen-Governor had then recently officiated at the nuptials of Atlantic and Erie, with the news of the bridal-approach, signaled from Buffalo to Manhattan in an hour and a half by relays of booming cannon. Dr. Mitchell had just poured a characteristic libation into the harbor-waves: the libation of waters gathered from every zone—from the Ganges and the Thames, the Nile and the Rhine, the Mississippi and the Danube, the Amazon and the Niger, as the tokens of that varied commerce which would gather about the island destined to become the commercial centre of the world. The first white marble building was rising in the stories of the American Museum, to astonish the citizens, whilst the jealousy of brick-layers had rendered necessary the importation of a State prison convict to commence the labor. The complexion of the city was fresh, and its features illy formed. Its Municipal Hall, in *the* Park, was of necessity virtuous, watched over by three religious temples—St. Paul's, the Brick, and the Murray street churches. The new gas lamps annoyed the eyes of sleepy watchmen. Chelsea, Greenwich, and Rose Hill were distinctive names. The Tontine Coffee House was father-in-law, by suspicions, of the young Niblo's Garden, just beginning a suburban career. The far-away Croton had not yet received certificates of character from Professors Chilton and Doremus; and Central Park, a collection of farms, slept under summer sun, or autumn haze, or winter snows, oblivious of roads made from pulverized granite, and of trees plucked, Titan-like, from Westchester forests.

Next, group yourselves around milestone No. 31. Your eyes ache with concentrated gaze. Your ears are vexed with a climacteric of all sounds. American Industry has become a wide-spreading elm, with scores of parasites clinging to its trunk. Every county in this and in the adjoining States holds a local fair each year, at nearly all of which your 'Transactions' appear among the prizes. There are colleges set apart to labor, mechanics, and agriculture. Their professors swarm, as did Abbe's in the French revolution. There is but one metropolis, and the provinces are its 'profits.' It has, long ago, swallowed Chelsea and Greenwich, and digested Rose Hill. Its appetite is sharpening for Spuyten Duyvel and Yonkers. The Erie canal furnishes oil for the angry waves of politics, and has become a pet with all parties. The libations of Dr. Mitchell have appeased Cosmopolitan Mammon. Brick edifices are becoming exceptional. Of the churches whose matins and vespers wafted themselves upon the city fathers at council board or in 'tea-room' assembled, one has removed to within stone's throw of this desk, and the other has traveled more than two miles nearer to the North Pole! One unbroken procession of gas-burners are now marshaled, under civic authority, from Whitehall to Highbridge—ten miles and upwards!

Thus, having surveyed our route, turn your attention to the member of the Institute, amid his 'Daily Wonders,' at this period—his wonders of life, presented to him by the World of Invention. Examine these wonders by the rush-lights of thirty-one years ago, that were ignited by a philosophical poking of a wooden bodkin into a nest of acidulated cotton!

He arrives at the awakening of a Yankee alarm clock, to throw open the outer shutters by pressing an inner spring. The vapors of sleep pleasantly disappear before the perfumes which chemical skill has transplanted from a score of *parterres* to his toilette table. Dentists have sent him a coral reef of tooth paste for his sleep-parched mouth; or, if he be a man of middle age, have enabled him to ring the bell, "bidding the waiter bring him a fresh Auroplastic masticator." Majestic hair brushes electrify his ambrosial locks. A beard of hereditary stubbornness yields to the seductive approaches of dainty creams. Pliant bathing utensils invite the ablutions prized of 'gods and men.' He attires himself in linen, glossy from patent mangles, smoothed by patent sad-irons, and buttoned with self-adjusting clasps. Anti-consumptive suspenders are cased beneath a vest with an elastic back. Seamless slippers have coaxed his feet, and a gas stove, lighted by electricity, has warmed his dressing-room, upon a raw morning, to the temperature of May.

Descending to the breakfast-room, the Hebe of the apartment has taken the silver from the ornamental safe, and spread it upon the magical extension table. The meal is prepared. Positively the very newest coffee-pot has supplanted the old Parisian toy. The butter has been winner in a 2.40 heat, under pressure of an air-pressure churn. Soapstone warmers embrace the Yankee plates. The eggs for the omelette, after having been proved in the detector, or *oonoscope*, have been beaten by the elliptic whirligig; or, they were poached into the novel drop, and are to be eaten from Columbian glass, that need not blush beside Bohemian or Venetian. Condensed milk has amicably mingled with prepared cocoa, to be drank from cups decorated within a mile of the residence. The beef-steak has arisen from its procrustean bed of late invention. The bread has been kneaded by machinery, and baked in a patent oven. Steam had packed the flour barrels and made the staves. Marvellous mill power had presided at the grinding and bolting. The grain was reaped, and threshed, and fanned by three varied combinations of steam, that the season previous, by still another form, had puffed through furrows, 'over the hills and far away.' His breakfast over, Betty usurps with the patent carpet sweeper. *He* retires to a library easy chair, that would have comforted a martyr fresh from the inquisitorial rack. There, he consults the Beaumont barometer, and settles down to read a newspaper sheet whose fabric, a week before, was of cellar ropes, and which, whilst he was that morning playing the part of the Proverb-sluggard, had been born in one hour, with ten thousand brethren, over the Hoe press!

Soon, preparing for the rainy day, he buttons about him an India-rubber coat—

> "No matter whose—when will the controversy end, you say?
> Not 'til at least have passed a 'Good-year' and a 'Day.'"

Adjusting his gutta-percha soles, he walks noiselessly through his hall of Vermont tile, with the walls white from new applications of the liquified quartz, to turn the safety-lock of the front door that is closed by operation of an invisible spring. Or, he enters his Concord buggy, pulling over his knees the lap robe that successfully imitates the skin of the leopard, to be driven over streets that a combination of mechanical skill has swept over night. Or, he hails the omnibus, with the patent step; or beckons to the car with the last ventilation and the passenger 'registration,' that passengers of all politics agree to be perfectly constitutional.

Arrived at his place of business, a new stove glows honest welcome in his office (and thanks to the new ash-sifter, no gas *to-day*). Paper weights, poetical with art-tracery, confine the morning's mail of epistles, covered by adhesive envelopes of the invisible ruling. His penmanship is confused with the stock of patent pens, and patent pencils, and patent inkstands. As the correspondence is answered, a copying press preserves it for after years of reference, and the epistle from abroad sleeps between the sheets of the gumarabic letter book. His ledgers, ruled by machinery, invite his inspection with their flexible backs. Payments enter the money-drawer in bills, whose colorable devices laugh the counterfeiter's arts to scorn. Seated in rotatory office chairs, he holds electrical converse with distant correspondents over the exchanges of a dozen cities.

Walking homeward to the dinner, he hears a cry of fire. He laughs, as he thinks of the steam engine on the next block, and thinks he will get up a new insurance company, by way of relaxation. Relaxation and fire bring thoughts of the juveniles at home, and of the promised presents; so, entering some '*National Bazaar*,' he heaves a sigh over the toy-barrenness of his boyhood, and grows distracted amid the philosophical trinkets. He enters the domestic circle, to hear the grateful music of the sewing machine, over whose purchase were held thirty family councils, corresponding to the numeral choice. Beside it sits grandmama, with new periscopic spectacles, investigating the mysteries of a knitting machine. In the corner, 'Tom' is reading, as a thing of the past, Thomas Hood's Song of the Shirt! Not far off, a daughter forces him to acknowledge, in her quiet delight, that since the United States government have taken up the proper cudgels of morality, no home *is* complete without the stereoscope! Wifely whispers are heard concerning incredible discoveries in the outskirts of fashion, amid crinoline labyrinths, or asking for the new slate globes and the patent orrery for the school room!

But, hark! the dinner bell; not that Fejee tomtom of the last century, but one like 'lovers' tongues at night, silver sweet.' It summons the household to a meal whose aroma of food is caught by patent process over the new range—to a meal where vegetables (can-preserved) mock the season—to a board where India-rubber knife handles and gutta-percha napkin rings defy their juvenile owner's habits of slovenliness—to the *buffet* where Yankee or western wine is to be drank from bottles corked by machinery—to a meal where the flies, still buzzing in the temperate zone of the dining-room, enter, one by one, the basket of the clock-work guillotine on the mantel.

When the meal is finished, he retires to a game of billiards on a Yankee table, with the new billiard register presiding over patent cues and maces.

Taking a last look before bed-time at the favorite pantry, no more inhabited by the house-beetles that once poured forth like an army of household Goths and hearthstone Huns, to Vandalize the larder, he places on the doors the burglar guard and examines his patent pistol. Soon, on an elliptic or hydrostatic mattrass, beneath a flexible canopy, in a bedstead scrolled by machinery and carved by steam, he falls asleep to awaken again to some new daily wonder!

Every invention in this catalogue of daily life has sought, within some one of the thirty-one years past, the hospitality of an American Institute Fair; however naked, has been by its auspices clothed; and, however a stranger, has been there naturalized into popularity!

III. At a very early era nations discovered that emulation was the spur of industry. But especially is it true in this age of the working and thinking man, as distinguished from previous ages of the fighting and unreasoning man. Wherever there is an exhibition of the products of industry, it becomes the apotheosis of the intelligent laborer. This emulation, and that healthy stimulus, logically result from a concentration of those products. All improvements are in arithmetical progression. And the great edifice of Invention, is pyramidical in form, each new one rising upon the base of some previously adopted principle in art or physics. The best mathematician works out problems most readily when he has the diagram before him; and the history of the world is full of instances wherein the physical results of one invention, when given to public inspection, has suggested many others. And the rewards offered for ingenious realizations of theories have again and again accomplished their ends.

IV. Institutions for the exhibition of the results of industry, are by no means ancient; nor, until quite recently, were they very common. One of the earliest (and the most remarkable, as an adjunct of the times,) was that in France, in 1797, in the chateau St. Cloud, under the auspices of Minister Neufchateau. Napoleon was prompt to perceive the utility of exciting an emulation of excellence among his manufacturers, by means of 'expositions.' Their annals are familiar to the student of history. But few of these had been held in *England*, at the grant of your charter. Since 1829, these have been held in Spain—Barcelona ranking, in respect to them, as the Manchester to Madrid. And everywhere has each exhibition proved a period of comparison for neighbors, rivals, and competing localities. Nor is it necessary to the maintenance of the argument on which expositions of industry depend, that there should be perfection in every specimen of skill. We may not turn away from tissues that none can wear, nor curl the lip at beginnings, for every invention, however crude, may be capable of improvement, and may stimulate to more skillful exercise of duties and craft. More than all, such exhibitions and annual fairs direct mental energies to specialties, and in these again to the minutest point. The knowledge acquired herein, however, becomes the property of the community at large. Formerly, discovery was attended with more or less secrecy; but the publicity of the present day causes that, no sooner is a discovery or invention made, than it is soon improved upon and surpassed by competing efforts. How often a public caprice suggests private practical industry! *You*, who may have studied every step of the journey, by which the annual fairs have traveled from Masonic Hall towards Niblo's and Castle Gardens; and to the Crystal Palace and the Palace Gardens, must have been amazed and delighted to note how the germs of one year became the bud of another, and the fruit of succeeding ones matured to be yet again grafted and improved. *You* have observed, in every improvement and advance, the comprehension of the external cause to which all science relates, or how the comparison of industrial results taught *precision* of knowledge—one opposed to shams. There may have been quackeries found, but were they not compelled to stand in the daylight with *realities*? *Most* direct has been the influence of *this* body, by its discussions in private, and its patronage in public. How many poor and struggling inventors have found a first round in the ladder of success in the mere advertisement which a display of the fair afforded! Messieurs inventors and manufacturers! it is no small favor to have been introduced to twenty or thirty thousand people, from every American latitude, and by becoming part of the gossip of the day, to have next been trumpeted by the press throughout the length and breadth of the land. What return have the inventors and mechanics, the farmers and the manufacturers made to this Institute, that is suitable, or that is ample? There *should* have long since gathered together, from every State, those whose names are upon the beneficed roll of some *one* of the quarter-century fairs of the American Institute; vowed to make it a practical National Museum of Art and Agriculture, Science and Mechanics, with extended and permanent accommodations, with every aid that gratitude should inspire! In this respect, shall our national foible of vanity be counteracted by our national sin of selfishness, and our national crime of ingratitude?

V. Thus much of the Past.

But what wizard dare stereoscope the Future of Art, Science, Agriculture, and Mechanics? These have ever had their distinctive and distinguished epochs, under which have been gathered lesser events. The one now commenced is an epoch of monster ships. And when science has entirely subdued the ocean, the air is yet left for conquest. Alexander the Great, at just the age of the American Institute, was sighing to conquer more worlds.

Some Red-Sea railroad will soon extend beneath the sacred shadows of Mount Sinai. The solemn echoes will shrink before the shrill music of the Calliope. What a gathering point would be there found for a meeting of the Christian centuries of invention, should we invest them with mythological form.

There, would stand the first century, feeble with the ill-treatment of the 'Bad Emperors,' having nothing to show but the improved war engines which worked out Jerusalem's woe. The second century would totter after, holding up the anatomical preparations of Galen. The next century would appear clad in robes of India silk. Century the fourth would stand beneath cathedral piles, pointing to the new church bells. The succeeding century would extend its bloody hands, pointing only to improved weapons of massacre. The seventh century would brighten up to tell of the glass and glass windows it brought to England. You would observe its successor, in Arab costume, unrolling the cotton paper of Bucharia. Century the ninth, amid all the thoughts of dire desolation it might at first inspire, would sing anthems, for it gave to the world of ages musical annotation. Dark and debased century the tenth would boast, in demoniac glee, it secret poisons and ingenious inquisitorial mechanism. The eleventh century would slyly laugh, as it told of its crusades and its newly-invented wind mills—not improperly in conjunction. Century the twelfth would plausibly urge its claim to the original ownership of the *Marietta*, or Mariner's Compass. Its next door neighbor would vaunt itself of spectacles and perfected clocks. The fourteenth would stand sooty with chimneys and freshly-delved coals. Mr. Fifteenth would mutter of its improved English manufacture of glass, but stand up proudly to show its hands soiled with honest black from the printing press, and exclaiming: "I have originated the ninth and greatest crusade against feudalism, bigotry, and crime, with weapons of types!" On the back of the sixteenth would ride Galileo, with Telescopes pointing starward. The seventeenth would hold about its neck the Barometer. Close upon its heels would follow the eighteenth, carrying the Thermometer of Fahrenheit and the Air Pump. But in that centurial group of inventions would grandly tower the nineteenth century, prematurely grey, with steaming nostrils and magnetic eye, inviting her aged ancestors to her homes in Western Europe and America, rich with luxury and consoling in hospitality to these Past Ages, that were wearied by so much varied wandering. And no one of the other eighteen centuries, however haughty or proud any of them in the by-gone time may have been, would offer, there, to pull from the brow of this nineteenth century, its Fortunatus cap of Genius, embroidered with 'Daily wonders of Life.'

REPORT

OF THE BOARD OF MANAGERS OF THE THIRTY-FIRST ANNUAL FAIR OF THE AMERICAN INSTITUTE.

The Board of Managers of the Thirty-first Annual Fair, in pursuance of the 29th section of the by-laws, respectfully

REPORT:

That the board held its first meeting on the 28th of February, 1859, and was organized by the election of David R. Jaques, chairman, and John W. Chambers, secretary. A by-law was subsequently adopted by the board, providing for two secretaries, and Mr. Chambers was accordingly elected the recording, and Mr. William B. Leonard, the corresponding secretary.

It is made the imperative duty of the Board of Managers, "unless otherwise ordered by the Institute," to hold in the autumn of each year "a fair in the city of New York, embracing an exhibition of the products of agriculture, commerce, manufactures, and the arts, a cattle show, embracing pure breeds and farming stock, a testing of plows, and a spading match."

Having received no direction to the contrary from the Institute, the managers felt that they had but one course to pursue, and determined at once to hold the fair, although circumstances of peculiar discouragement furnished grounds for some misgivings, as to the pecuniary result.

Fire had swept from the earth, in half an hour, on the 5th of October, 1858, the Crystal Palace, and the vast collection of articles of American art and industry, which were on exhibition at our last annual fair, snatching from us, at the moment when the exhibition had reached its highest point of interest, and the receipts gave promise of the most satisfactory results, the fruits of many days and months of labor and of anxiety, and at the same time destroying an edifice which the Institute had secured by lease for the two succeeding years—a building as beautiful in its design and proportions as it was unique in its materials and construction, and peculiarly adapted to the purposes of a fair. The northward movement of population was every day rendering it more central and accessible, and its loss is even now less fully felt by the citizens of New York, than it is likely to be hereafter.

In consequence of this disaster, it became of course the first duty of the board to take measures for securing a proper place for holding the fair. After considering the comparative advantages of the various places proposed, among which were the Cooper Institute, and the State Arsenal, on Seventh avenue, the board came to the conclusion that the Palace Garden, on the north side of Fourteenth street, between Sixth and Seventh avenues, united more advantages of space and location than any other, including a new hall, fifty feet in width and two hundred feet long, grounds of the same depth, with a frontage of two hundred feet on Fourteenth street, and furnishing ample space for the erection of an Arcade for steam engines and moving machinery, of a tent for agricultural implements, flowers, vegetables, and fruits, of galleries for vehicles, iron castings, and other heavy articles, while the main hall was well adapted for the exhibition of articles of art, ornament, and domestic use.

Although the space afforded was greatly less than at the Crystal Palace, which, with its galleries, enclosed five acres, it was hoped that the situation of the Garden, which, as regards the dwellings of the city, is perfectly central, would favor a large attendance, and the managers determined, by greater discrimination in the selection of articles for exhibition, at once to raise the standard of our fair, and to lessen the inconvenience of lack of space.

A lease was accordingly obtained from Mr. C. V. De Forest, of Palace Garden, from the 15th of September to the 5th of November, which was approved by the Institute June 1, 1859.

The board would gratefully acknowledge the generous donation of $500 by the Sixth Avenue railroad company, which was promptly paid towards our expenses in leasing Palace Garden.

By-laws were adopted by the board May 18, 1859, in accordance with which, standing committees were on that day appointed:

On Finance—B. Lewis, Jr., chairman. Printing and Publication committee—D. M. Reese, chairman. Tickets—James C. Baldwin, chairman. Premiums—John A. Bunting, chairman. Invitations—James Renwick, chairman. Horticulture—A. Bridgeman, chairman. Police—William Ebbitt, chairman. Light—John Johnson, chairman. Reception of Goods—William B. Leonard, chairman. Music—J. V. Brower, chairman. Flags, Freight, and Transportation—F. W. Geissenhainer, Jr., chairman. Steam Power—W. B. Leonard, chairman. Carpenters' Work—J. A. Bunting, chairman. Stands and Refreshments—George Timpson, chairman. Conference with the Board of Agriculture—J. A. Bunting, chairman.

By an amendment of the by-laws of the Institute, passed last year, the trustees became *ex-officio* members of the board, and gave the managers their active aid and counsel.

Unusual interest was early expressed in the agricultural exhibition. It was urged by many that special efforts should be put forth to render this branch of the exhibition full and complete.

In his report to the board of April 22, 1859, Mr. Leonard, the agent, recommended that prompt measures be taken for securing an exhibition of the character of the State Fairs, which are doing much to raise the standard of American agriculture.

The direction of the agricultural fair was referred to the standing committee of the Institute on agriculture, and this committee, by an amendment of the by-laws of the Institute, was authorized to add ten members to their number, and the committee were thus enabled to secure the aid and advice of many gentlemen well known for their knowledge of agriculture and their interest in the subject. The gentlemen thus added to the committee, were:

Simeon Leland, James Knight, John G. Bergen, Lewis G. Morris, Solon Robinson, John Jay, E. A. Lawrence, Thomas Bell, C. M. Saxton, J. A. Bunting.

The Third Avenue railroad company, with great liberality, offered, through their president, William A. Darling, Esq., and their secretary, Samuel B. Isaacs, Esq., the use of their grounds, near Hamilton Park, on the east side of the Third avenue, between 66th and 67th streets, and of the upper halls of their spacious and beautiful depot adjoining, free of charge for the agricultural fair.

A proposition from the New York Horticultural Society, to hold their annual exhibition for the year in connection with our agricultural fair, was received through a committee from that body, and referred to the committee on agriculture, with full power to co-operate with the society, and we were indebted to it for a very fine and full display of flowers, fruits, and vegetables, in the halls of the depot.

So important was it deemed that the board of agriculture should be untrammeled in the management of the agricultural fair, that the original resolution, authorizing them to take all necessary steps for holding it, subject to the action of the Board of Managers, was amended by striking out the qualifying clause, and in fact the zeal and assiduity of the board of agriculture, in the discharge of their duties, fully justified the confidence which the Board of Managers uniformly manifested, by leaving the entire management of this department to them.

The liberal offer of the Third Avenue railroad company having been accepted, the lease of Palace Garden approved, and the arrangement made with the New York Horticultural Society, the managers lost no time in issuing their circular, announcing the agricultural fair on the 13th, 14th, and 15th of September, (but adjourned to the 21st, 22d, and 23d of September, to accommodate the State Fair of New Jersey, and the Queens County Fair, with expectations of large contributions from those fairs to our's, which proved unfortunate, as it brought our exhibition into the Equinoctial storm,) and the general fair for the 21st of September, to continue to the 28th of October.

No pains were spared in calling the attention of inventors, patentees of new inventions, and agents for the sale of articles of novelty and interest, nor was personal application to large manufactories, and others, omitted. The agent was untiring in his exertions. Farmers, and the raisers of thorough-bred cattle, horses, and sheep, (of whom, so great, we are proud to say, is the daily progress of American scientific agriculture, the number is rapidly increasing everywhere in the United States,) were invited to avail themselves of the opportunity offered by the exhibition at Hamilton Park, of showing to the people of the metropolis, and the thousands who resort hither, what has been done, and is doing to raise, perfect, and render more lucrative that branch of ndustry in which the great mass of the people is concerned, and on which, as on a sure foundation, the material interests of the people rest. The artist and artisan, the mechanic and inventor, on the other hand, who work up the material agriculture affords, who raise the superstructure of which it lays the foundation, would come forward, we were assured, with their accustomed alacrity, to enrich our exhibition of art and industry.

The subject of steam plows, alike interesting to farmer and inventor, was early brought before the committee, and a discretionary premium of one thousand dollars was offered for the best working steam plow, American or foreign.

Notices of the fair, and of the premium for steam plows, were published in the "London Times," and "Mark Lane Express," and the holding of both fairs was widely advertised, and announced by handbills, as well as circulars.

The agricultural fair was held, as announced. We believe that for number, variety, and purity of breed of the animals, and beauty, variety, and excellence of the fruits, vegetables and flowers exhibited, it is conceded that it surpassed any former exhibition. The following is a statement of the entries:

Horses,	84
Cattle,	141
Sheep,	27
Swine,	17
Poultry,	203
Agricultural implements,	27

Embracing four large assortments from agricultural warehouses.

The list of premiums awarded, furnishes many interesting details.

One unavoidable circumstance frustrated the efforts (so far as pecuniary results are concerned) of the board. During the time allotted for the reception of goods, and during the three days of the fair at Hamilton Park, we were visited with an unintermitting storm of rain, with high winds, which delayed the arrangements, deterred exhibiters from coming forward who promised contributions, and kept thousands of visitors away.

The extraordinary efforts bestowed upon the agricultural fair, necessarily engrossed an unusual share of the time and attention of the officers of the Board of Managers. The unfavorable weather deterred exhibiters at the fair at Palace Garden from coming forward as promptly as usual. The time of opening the exhibition was therefore postponed until September 27th, when the fair was formally opened by an address from our venerable recording secretary, Henry Meigs, whose zeal for art and industrial progress seems to grow with his growth in years, and who, in the freshness of his sympathy with the spirit of invention and discovery, which mark the age, seems himself to have discovered the secret of perpetual youth.

The exhibition closed on the 29th of October, with an able address by the Hon. A. Oakey Hall, of this city.

Of the character of the fair at Palace Garden, it is not for us to speak. The list of premiums annexed, is more eloquent than any criticism in general terms. Among the original inventions exhibited were Fawkes' steam plow, which was brought on at the expense of the board from Chicago, and exhibited at Palace Garden, and also at Hamilton Park. For the exhibition of this plow, deemed by many the most successful working steam plow as yet devised, and to which the United States Agricultural Society, at its last fair held at Chicago, and the Illinois Central railroad company have both awarded large premiums, the board paid the ingenious inventor one thousand dollars. Among other new inventions exhibited were a wrecking pump of great capacity; a steam fire engine, giving Carey's rotary pump great efficiency; six steam and air engines, exhibiting new improvements; two ingenious apparatus for instantaneously lighting a large number of gas-burners by electricity; a new sub-marine explorer, and a contrivance to enable the deaf to hear at a distance the ordinary tones of a speaker's voice. The great variety of improved sewing machines exhibited, forty-five in number, shows the activity prevailing in this interesting department of invention.

The entries at the fair at Palace Garden were as follows:

In the manufacturing and mechanical department,	1,145
In the agricultural and horticultural department,	148
	1,293

The following premiums were awarded:

AT HAMILTON PARK—AGRICULTURAL FAIR.

1 gold medal,	$12 50
85 silver cups,	1,214 00
35 silver medals,	148 75
10 bronze medals,	22 50
12 diplomas,	4 32
Books,	1 00
	$1,403 07
Less $25, contributed,	25 00
	$1,378 07
Steam plow, cash,	$1,000 00

AT PALACE GARDEN.

Agricultural and Horticultural department.

1 gold medal,	$12 50
23 silver cups,	272 00
83 silver medals,	395 50
14 diplomas,	5 04
76 vols. of books,	120 00
	$805 04

Manufacturing and Mechanical department.

9 gold medals,	$132 50
12 gold medals, certified,	4 32
100 silver medals,	483 50
15 silver medals, certified,	5 40
65 bronze medals,	146 25
216 diplomas,	77 76
2 vols. Webster's Dictionary,	5 50
	$855 23
Total premiums,	$4,038 34

The following is a condensed statement of the receipts and expenditures of the Thirty-first Annual Fair:

RECEIPTS.

Sales of tickets at Palace Garden.

Tuesday,	September	27,	$75 00
Wednesday,	do	28,	160 00
Thursday,	do	29,	205 00
Friday,	do	30,	287 00
Saturday,	October	1,	305 00
Monday,	do	3,	395 00
Tuesday,	do	4,	570 00
Wednesday,	do	5,	550 00
Thursday,	do	6,	585 00
Friday,	do	7,	503 00
Saturday,	do	8,	300 00
Monday,	do	10,	320 00
Tuesday,	do	11,	600 00
Wednesday,	do	12,	515 00
Thursday,	do	13,	595 00
Friday,	do	14,	234 00
Saturday,	do	15,	502 00
Monday,	do	17,	276 00
Tuesday,	do	18,	300 00
Wednesday,	do	19,	366 00
Thursday,	do	20,	350 00
Friday,	do	21,	250 00
Saturday,	do	22,	266 00
Monday,	do	24,	265 00
Tuesday,	do	25,	400 00
Wednesday,	do	26,	280 00
Thursday,	do	27,	325 00
Friday,	do	28,	322 00
Saturday,	do	29,	323 00
Carried forward,			$10,374 00

Brought forward,		$10,374 60	
Fifteen cent tickets,		79 05	
Excursion tickets,		32 12	
Schools,		11 90	
			$10,497 07
Sales of tickets at Hamilton Park.			
Agricultural fair,			874 75
Steam plow,			299 50
			$11,671 32
Sales of lumber at Palace Garden,		$107 59	
Sales of smoke-pipe,		25 00	
From exhibiters, extra gas fixtures,		22 83	
			155 42
Sales of lumber at agricultural fair,			621 78
Contribution from Sixth Avenue R. R. Co.,			500 00
			$12,948 52
Appropriation from the Am. Institute,			3,300 00
			$16,248 52
Less discount on uncurrent money,			7 40
Amount to be accounted for,			$16,241 12

EXPENDITURES.

By Finance committee:			
Ticket sellers,		$171 00	
By Ticket committee:			
Ticket receivers, &c.,		156 50	
By Printing and Publication committee:			
Printing circulars, list of premiums, blanks, advertising, &c.,		714 64	
By Police committee:			
Superintendent police, day and night watch, labor, &c.,		1,434 48	
By Music committee:			
Music (Palace Garden),		1,105 00	
By Light committee:			
Gas,	$576 31		
Pipes and fixtures,	303 72		
		880 03	
By committee on steam power:			
Pay rolls, labor,	$353 70		
Freight on engines, shafting, &c., and truckage,	195 39		
Shafting, pullies, &c.,	271 47		
Carried forward,	$820 56	$4,461 65	$16,241 12

Brought forward, ...		$820 56	$4,461 65	$16,241 12
Use of locomotive boiler, ...		25 00		
Testing do		13 00		
Iron work, ...		135 09		
Pipes for steam, water, &c., ..		311 01		
Coal and wood, ...		284 29		
Oil, ...		32 89		
Mason work, &c., ...		60 18		
			1,682 02	
By committee on carpenters' work:				
Tent and expenses of erecting,		$428 92		
Awning and frame, ...		184 00		
Erecting machine arcade, ...		515 00		
Lumber, tables, &c., ...		329 02		
Pay roll, labor, ...		46 00		
Hardware, ...		29 44		
Show-boards, &c., ...		13 29		
			1,545 67	
By Refreshment committee:				
Refreshments for managers, &c.		$247 99		
do police (city),		67 77		
do engineer, ...		35 92		
			351 68	
By committee on Horticulture:				
Pay rolls, clerk and laborers, .		$318 00		
Tin tubes for flowers, ...		51 00		
Sand & sundry petty expenses,		7 45		
			376 45	
Agricultural Fair, Hamilton Park:				
N. Y. Horticultural Society, per resolution, ...		$300 00		
Lumber, ...		1,161 55		
Hardware, ...		66 22		
Carpenters' work, ...		621 94		
Pay roll, labor, ...		150 22		
Agent's expenses, ...		42 22		
Clerk hire, ...		14 00		
Ticket-sellers, receivers, and gate keepers, ...		92 00		
Wood and coal, fuel for engine,		19 93		
Music, Hort. exhibition, ...		122 00		
Refreshments, committees and judges, ...	$98 50			
do police (city),	22 00			
		120 50		
Cartage, labor, &c., ...		51 50		
Advertising and printing (special), ...		53 84		
Carried forward, ...		$2,815 92	$8,417 47	$16,241 12

Brought forward,	$2,815 92	$8,417 47	$16,241 12
Tools,	4 00		
Sundry expenses,	10 85		
		2,830 77	
Steam plow:			
Premium, per contract with the inventor,	$1,000 00		
Freight on plow,	160 00		
Expenses of laborers,	70 99		
Watchmen,	10 50		
Fuel,	11 00		
Cartage,	9 43		
Ticket sellers and receivers,	30 00		
Printing, advertising, &c.,	34 10		
		1,326 02	
By Premium committee:			
Amount of awards $3,038.34, of which has been paid $390.15, viz:			
Silver medals,	$184 15		
Cash premiums,	206 00		
		390 15	
Miscellaneous bills:			
Rent of Palace Garden,	$3,000 00		
Clerk hire,	124 00		
Trucks,	28 00		
Repairs and putting transparencies in order, at the close of the fair,	21 50		
Postage stamps, mats, and sundry disbursements,	99 47		
		3,272 97	
			16,237 38
Balance in the hands of the finance committee,			$3 74

There is still due, on account of the fair bills, for the following, viz:

Premiums, balance,	$2,648 19
Printing, advertising, &c.,	815 26
Water rent, gas and steam fixtures,	57 15
Lighting the Garden by electricity,	120 00
Fuel,	13 00
Belting,	20 67
Lettering signs,	19 65
Muslin for covering tables,	48 84
Use of crockery, horticultural department,	17 25
Clerk hire,	30 00
Sundry items,	32 65
	$3,822 66

Amount of bills unsettled, as above, ...		$3,822 66
Less in hands of finance committee, ...		3 74
		$3,818 92
From which deduct appropriation to be received from the State, ...	$950 00	
Taken from stock of premiums on hand, two large gold and thirty-eight large silver medals, and twenty-two cups, ...	494 62	
		1,444 62
Amount to be provided for, ...		$2,374 30

From the foregoing account, it will be seen that the excess of expenses, over the receipts, will be		$7,118 92
From which should be deducted property on hand, viz: Shafting, pullies, pipes, tables, trucks, tent, &c., ...	$1,300 00	
Appropriation from State, under act of May, 1841, ...	950 00	
		2,250 00
Shows a balance against the fair of............		$4,868 92

The unsatisfactory pecuniary result of our exhibition was, as we have intimated, not altogether unanticipated. Several untoward circumstances combined to baffle the special efforts that were made. But, so far as the character of the fair is concerned, we believe it was in no wise unsuccessful. Since the year 1829, when the American Institute was the first to establish a system of annual industrial exhibitions, until then unknown in Europe or America, the standard of public taste and public expectation has, as we are happy to know, and partly, we believe, through our own efforts, been very much elevated. We are willing that the exhibition of 1859, should be tried by that standard.

We believed, and believe, that the pecuniary results, although important, are not a paramount consideration with the American Institute. We believed, when we commenced our labors in February, and still believe that our duty to the American farmer, inventor, and mechanic is higher still. Every year we offer them an opportunity to exhibit to New York, and the world, their products and inventions, without charge, and with a fair chance of obtaining premiums of considerable intrinsic value, and which, as badges of excellence and passports to public favor, are invaluable, and have been to many the key to fortune.

This opportunity they expect from us, and we feel that that necessity should be imperative indeed, which compelled us to disappoint them. But let the American inventor, mechanic, manufacturer, and farmer remember that they also have a duty to perform. Let them promptly come forward, bringing to our autumnal feast of industry the first fruits of their science and genius.

By our charter we are designated as the American Institute of the City of New York. We feel, and shall endeavor to act up to the conviction that by our position at the centre of American population and trade and industry, we are *American* in a wider sense, and are the *Institute* of the State and of the Union.

All which is respectfully submitted.

NEW YORK, *January* 3, 1860.

DAVID R. JAQUES,
WILLIAM EBBITT,
WILLIAM H. BUTLER,
ISAAC M. PHYFE,
JOHN JOHNSON,
WILLIAM CLOSE,
THOMAS W. FIELD,
JAMES C. BALDWIN,
CHARLES A. WHITNEY,
F. W. GEISSENHAINER, JR.,
ARCHIBALD JOHNSTON,
THOMAS F. DE VOE,
SAMUEL H. MAYNARD,
GEORGE PEYTON,
ZACHARY PECK,
JOHN C. JOHNSON,
ALFRED BRIDGEMAN,
THOMAS WILLIAMS, JR.,
D. MEREDITH REESE,
GEORGE TIMPSON,
BENEDICT LEWIS, JR.,
ROBERT MARSHALL,
JOHN F. CONREY,
JAMES RENWICK,
WILLIAM HALL,
BENJAMIN AYCRIGG,
JOHN A. BUNTING,
WILLIAM B. LEONARD,
HENRY MEIGS,
JOHN GRAY,

Managers.

LIST OF PREMIUMS

AWARDED BY THE MANAGERS OF THE THIRTY-FIRST ANNUAL FAIR OF THE AMERICAN INSTITUTE, 1859.

AGRICULTURAL FAIR AT HAMILTON PARK.

HORSES.

CLASS 1.—*Thorough Bred.*

Judges—Wm. A. Leffiingwell, A. Asboth.

J. & A. Bathgate, Morrisania, N. Y., for the best stallion, "Mango." Silver cup, $25.

J. & A. Bathgate, Morrisania, N. Y., for the best brood mare and colt, "Morrisania Maid." Silver cup, $25.

J. & A. Bathgate, Morrisania, N. Y., for the best three year old colt, "Comet." Silver cup, $10.

B. M. Whitlock, West Farms, N. Y., for the best two year old colt, "Young Revenue." Silver cup, $8.

CLASS 2.—*Horses for all work.*

Judges—Abraham Hatfield, Wm. Varian, Sam'l B. Isaacs.

S. R. Bowne, Flushing, L. I., for the best stallion, "Toronto Chief." Silver cup, $25.

S. R. Bowne, Flushing, L. I., for the second best stallion, "Trojan." Silver cup, $20.

Geo. H. Felt, Harlem, N. Y., for the third best stallion "Extension." Silver cup, $15.

S. R. Bowne, Flushing, L. I., for a stallion, "Young Trustee." Silver medal.

J. & A. Bathgate, Morrisania, N. Y., for the best brood mare and colt. Silver cup, $20.

B. M. Whitlock, Hommock Domain, West Farms, N. Y., for the second best brood mare and colt. Silver cup, $15.

Geo. Bolton Alley, New Rochelle, N. Y., for the best three year old colt. Silver cup, $10.

Thomas Whitson, Flushing, L. I., for the second best three year old colt. Silver medal.

S. R. Bowne, Flushing, L. I., for the best two year old colt. Silver cup, $8.

Peter Van Antwerp, 174 Greenwich street, for the second best two year old colt. Silver medal.

Daniel Winkens, 3d avenue and 58th street, for the best draft horse. Silver cup, $15.

James Graley, Jr., 83 Elizabeth street, for the second best draft horse. Silver medal.

CLASS 3.—*Matched Horses.*

Judges—Geo. Bolton Alley, Sam'l B. Isaacs, Abraham Hatfield.

Maltby G. Lane, 48 Tenth street, N. Y., for the best pair of matched horses. Silver cup, $20.

N. H. Babcock, Jr., 58th street, E. R., for the second best pair of matched horses. Silver cup, $15.

Wm. A. Darling, Westchester county, N. Y., for the third best pair of matched horses. Silver cup, $10.

B. M. Whitlock, Hommock Domain, Westchester county, N. Y., for the best pair of farm horses. Silver cup, $20.

Wm. Simpson, Jr., West Farms, N. Y., for the second best pair of farm horses. Silver cup, $15.

CLASS 4.—*Mules.*

Judges—A. M. Suydam, J. W. King, Wm. Meekes.

B. M. Whitlock, Hommock Domain, West Farms, N. Y., for a pair of mules. Silver cup, $10.

CLASS 5.—*Single Horses.*

Judges—Abraham Hatfield, Wm. Varian, Sam'l B. Isaacs.

B. M. Whitlock, Hommock Domain, West Farms, N. Y., for the best roadster, "Belle of Westchester." Silver cup, $15.

Thos. Rutter, Yorkville, N. Y., for the second best roadster. Silver cup, $10.

SPECIAL CLASS.—*Saddle Horses.*

Judges—Wm. A. Leffingwell, J. W. Ehninger, Alex. Ashbeth.

Philip M. Lydig, Jr., 34 Laight street, for the best saddle horse. Silver cup, $50.

CATTLE.

CLASS 6.—*Improved American, or "Native" Stock.*

Judges—John T. Andrew, Jaques Van Brunt, John Harold.

Robert Wilkinson, Westchester, N. Y., for the best bull two years old. Silver cup, $25.

Hugh Lunny, Westchester, N. Y., for a two year old bull. Silver medal.

Leonard D. Clift, Croton Falls, N. Y., for the best yearling bull. Silver cup, $10.

S. B. Fish, 63d street, E. R., for the second best yearling bull. Silver medal.

John Hyland, 61 Robinson street, N. Y., for the third best yearling bull. Transactions Am. Institute.

Rob't. Wilkinson, Westchester, N. Y., for the best bull calf. Silver cup, $8.

Rob't Wilkinson, Westchester, N. Y., for the second best bull calf. Silver medal.

Rob't Wilkinson, Westchester, N. Y., for the best cow three years old. Silver cup, $20.

Charles W. Bathgate, Fordham, N. Y., for the second best cow. Silver cup, $15.

Hugh Lunny, Westchester, N. Y., for the third best cow. Silver cup, $10.

Terence Sheridan, Yorkville, N. Y., for a cow, "Dairy Maid." Transactions Am. Institute.

Terence Sheridan, Yorkville, N. Y., for the best heifer two years old. Silver cup, $15.

Rob't Wilkinson, Westchester, N. Y., for the second best heifer. Silver cup, $10.

Terence Sheridan, Yorkville, N. Y., for the best heifer one year old. Silver cup, $10.

Terence Sheridan, Yorkville, N. Y., for the second best heifer one year old. Silver medal.

Rob't Wilkinson, Westchester, N. Y., for the best heifer calf. Silver cup, $8.

George Warner, Bloomingdale, N. Y., for the second best heifer calf. Silver medal.

Terence Sheridan, Yorkville, N. Y., for the third best heifer calf. Transactions Am. Institute.

Special Class.

Judges—John T. Andrew, Jaques Van Brunt, John Harold.

James Cauthers, 22 Sixth street, N. Y., for the best cow. Silver cup, $10.

Leonard D. Clift, Croton Falls, N. Y., for the second best cow. Silver medal.

John V. Plume, Shrub Oak, Westchester county, N. Y., for three improved heifers at one birth, two years old, with two calves. Silver medal.

Hugh Lunny, Westchester county, N. Y., for three fine cows. Silver medal.

Class 7.—*Short Horns.*

Judges—Edward G. Faile, Thos. G. Ayerigg.

Simeon Leland, New Rochelle, N. Y., for the best bull three years old, "Farnley." Mr. Leland being a member of the board, is debarred from receiving a premium, by the rules of the Institute.

B. M. Whitlock, West Farms, N. Y., for the second best bull three years old, "Stanley." Silver cup, $15.

Noel J. Becar, Smithtown, L. I., for the best bull two years old, "2nd Duke of Oxford." Silver cup, $15.

J. & A. Bathgate, Morrisania, N. Y., for the best cow, "Beauty." Silver cup, $20.

J. & A. Bathgate, Morrisania, N. Y., for the second best cow, "Peony." Silver cup, $15.

Simeon Leland, New Rochelle, N. Y., for the best heifer one year old. Mr. Leland being a member of the board, is debarred from receiving a premium, by the rules of the Institute.

J. & A. Bathgate, Morrisania, N. Y., for the second best heifer one year old, "Esterville." Silver cup, $10.

CLASS 8.—*Devons.*

Judges—Chas. W. Bathgate, Geo. Hartshorne, Edward Waite.

Edward G. Faile, West Farms, N. Y., for the best bull two years old. Silver cup, $15.

Edward G. Faile, West Farms, N. Y., for the best yearling bull. Silver cup, $10.

John T. Andrew, West Cornwall, Conn., for the second best yearling bull. Silver medal.

John T. Andrew, West Cornwall, Conn., for the third best yearling bull. Transactions Am. Institute.

Edward G. Faile, West Farms, N. Y., for the best bull calf. Silver cup, $8.

Edward G. Faile, West Farms, N. Y., for the second best bull calf. Silver medal.

John T. Andrew, West Cornwall, Conn., for the third best bull calf. Transactions Am. Institute.

Edward G. Faile, West Farms, N. Y., for the best cow three years old. Silver cup, $20.

John T. Andrew, West Cornwall, Conn., for the second best cow three years old. Silver cup, $15.

John T. Andrew, West Cornwall, Conn., for the third best cow three years old. Silver cup, $10.

Edward G. Faile, West Farms, N. Y., for the best heifer two years old. Silver cup, $15.

John T. Andrew, West Cornwall, Conn., for the second best heifer, two years old. Silver cup, $10.

Edward G. Faile, West Farms, N. Y., for the best heifer one year old. Silver cup, $10.

Edward G. Faile, West Farms, N. Y., for the second best heifer one year old. Silver medal.

John T. Andrew, West Cornwall, Conn., for the third best heifer one year old. Transactions Am. Institute.

Edward G. Faile, West Farms, N. Y., for the best heifer calf. Silver cup, $8.

Edward G. Faile, West Farms, N. Y., for the second best heifer calf. Silver medal.

John T. Andrew, West Cornwall, Conn., for the third best heifer calf. Transactions Am. Institute.

CLASS 9.—*Herefords.*

Judges—Chas. Bathgate, Henry Beeckman.

Geo. Hartshorne, Rahway, N. J., for the best cow, "Annie." Silver cup, $20.

Geo. Hartshorne, Rahway, N. J., for the second best cow, "Mary." Silver cup, $15.

Geo. Hartshorne, Rahway, N. J., for the best heifer one year old, "Sophia." Silver cup, $10.

Geo. Hartshorne, Rahway, N. J., for the best heifer calf, "Nell." Silver cup, $8.

Geo. Hartshorne, Rahway, N. J., for the best yearling bull, "Owego." Silver cup, $10.

CLASS 10.—*Ayrshires.*

Judges—Chas. W. Bathgate, Edw. Waite, Geo. Hartshorne.

William Watson, Westchester, N. Y., for the best bull three years old. Silver cup, $25.

William Watson, Westchester, N. Y., for the second best bull. Silver cup, $15.

William Watson, Westchester, N. Y., for the best yearling bull. Silver cup, $10.

William Watson, Westchester, N. Y., for the best bull calf. Silver cup, $8.

William Watson, Westchester, N. Y., for the second best bull calf. Silver medal.

Thomas Richardson, West Farms, N. Y., for the best cow. Silver cup, $20.

William Watson, Westchester, N. Y., for the second best cow. Silver cup, $15.

William Watson, Westchester, N. Y., for the third best cow. Silver cup, $10.

William Watson, Westchester, N. Y., for the best two years old heifer. Silver cup, $15.

William Watson, Westchester, N. Y., for the second best two years old heifer. Silver cup, $10.

William Watson, Westchester, N. Y., for the third best two years old heifer. Transactions Am. Institute.

William Watson, Westchester, N. Y., for the best one year old heifer. Silver cup, $10.

William Watson, Westchester, N. Y., for the second best one year old heifer. Silver medal.

William Watson, Westchester, N. Y., for the third best one year old heifer. Transactions Am. Institute.

William Watson, Westchester, N. Y., for the best heifer calf. Silver cup, $8.

William Watson, Westchester, N. Y., for the second best heifer calf. Silver medal.

Class 11.—*Alderneys.*

Judges—John T. Andrew, John Bathgate, Rob't Wilkinson.

Thos. Messenger, Great Neck, Queens county, N. Y., for a bull three years old. Silver cup, $10.

John Haven, 7 Beaver street, N. Y., for the best two year old bull. Silver cup, $15.

John Haven, 7 Beaver street, N. Y., for the best bull calf. Silver cup, $8.

John Haven, 7 Beaver street, N. Y., for the best cow. Silver cup, $20.

Wm. Watson, Westchester, N. Y., for the second best cow. Silver cup, $15.

Shepherd Knapp, Melbourne, N. Y., for the third best cow. Silver cup, $10.

John Haven, 7 Beaver street, N. Y., for the best heifer two years old. Silver cup, $15.

John Haven, 7 Beaver street, N. Y., for the best yearling heifer. Silver cup, $10.

Shepherd Knapp, Melbourne, N. Y., for the second best yearling heifer. Silver medal.

Thos. Messenger, Great Neck, Queens county, N. Y., for the third best yearling bull. Transactions Am. Institute.

John Haven, 7 Beaver street, N. Y., for the best heifer calf. Silver cup, $8.

Class 12.—*Herds.*

Judges—John T. Andrew, John Bathgate, Rob't Wilkinson.

Edward G. Faile, West Farms, N. Y., for the best herd of Devon cattle, owned by the exhibiter for a period of three months previous to the exhibition, not less than twenty in number, consisting of working oxen, steers, milch cows, and bulls, and cows for breeding. Silver plate, $50.

The committee were exceedingly pleased with this beautiful herd of Devons. Several of the herd imported were selected with exceeding taste from the best breeders of England, while the younger progeny seem fully equal to their beautiful progenitors.

The proprietor deserves the highest praise, both for his judgment in their selection and for the care devoted to his stock.

Class 13.—*Milking Cows.*

Judges—John Bates, Henry Beeckman.

Nicholas Halley, Flushing Bay, L. I., for the best cow in milk four years old. Silver cup, $20.

Hugh Lunny, Westchester, N. Y., for the second best cow in milk. Silver cup, $15.

Hugh Lunny, Westchester, N. Y., for the third best cow in milk. Silver cup, $10.

Class 14.—*Working Oxen.*

Judges—Wm. Bigelow, S. G. Bowne, Asa B. Munn.

Edward G. Faile, West Farms, N. Y., for the best pair of working oxen. Silver cup, $20.

CLASS 16.—*Middle Wool Sheep.*

Judges—L. D. Clift, Edw. Waite.

Geo. Hartshorne, Rahway, N. J., for the best South Down buck. Silver cup, $10.

Thos. Messenger, Great Neck, Queens county, N. Y., for the second best Hampshiredown buck. Silver medal.

Thos. Messenger, Great Neck, Queens county, N. Y., for the best pen of three ewes, "Hampshiredown." Silver cup, $10.

CLASS 18.—*Swine.*

Judges—Jacob Mott, Adrian Bergen.

Thos. Messenger, Great Neck, Queens county, N. Y., for the best boar over two years old. Silver cup, $10.

Allan Macdonald, Flushing, L. I., for the best boar over one year old. Silver cup, $8.

Henry Fenner, South Orange, N. J., for the second best boar one year old. Silver medal.

Henry Fenner, South Orange, N. J., for the third best boar one year old. Transactions Am. Institute.

Henry Fenner, South Orange, N. J., for the best sow over two years old. Silver cup, $10.

Thos. Rutter, Yorkville, N. Y., for the second best sow over two years. Silver medal.

Allan Macdonald, Flushing, L. I., for the best sow over one year. Silver cup, $8.

Henry Fenner, South Orange, N. J., for the second best sow over one year. Silver medal.

Henry Hales, Fort Washington, N. Y., for two Berkshire pigs. Diploma.

CLASS 19.—*Fancy Poultry, &c.*

Judges—Garret G. Bergen, Daniel Fowler.

Wm. Simpson, Jr., West Farms, N. Y., for the best and greatest variety of poultry, Silver cup, $15.

John Rafferty, Woodstock, N. Y., for the second best and greatest variety of poultry. Silver medal.

John Rafferty, Woodstock, N. Y., for the best six turkeys. Silver medal.

Wm. Simpson, Jr., West Farms, N. Y., for a pair of turkeys. Transactions Am. Institute.

Wm. Simpson, Jr., West Farms, N. Y., for the best six geese. Silver medal.

Wm. Simpson, Jr., West Farms, N. Y., for the best six ducks. Silver medal.

Jas. C. McKinley, 192 Rivington street, for the best and largest variety of pigeons. Silver cup, $10.

Henry Hales, Fort Washington, N. Y., for Seabright Bantams. Browne's Am. Poultry Yard.

CLASS 21.—*Agricultural Implements and Machinery.*

Judges—John Harold, Jaques Van Brunt.

A. F. Mayher & Co., 54 Vesey street, N. Y., for the best and most extensive assortment of agricultural implements. Gold medal.

T. W. & J. H. Mulford, Orange, N. J., for the best spring wagon for general use, with a very ingeniously constructed brake. Silver medal.

A. F. Mayher & Co., 54 Vesey street, N. Y., for the best grain cradle and scythe. Bronze medal.

A. F. Mayher & Co., 54 Vesey street, N. Y., for the best three garden spades. Diploma.

A. F. Mayher & Co., 54 Vesey street, N. Y., for the best three shovels. Diploma.

A. F. Mayher & Co., 54 Vesey street, N. Y., for the best three hoes. Diploma.

A. F. Mayher & Co., 54 Vesey street, N. Y., for the best hay rakes. Diploma.

A. F. Mayher & Co., 54 Vesey street, N. Y., for the best three manure forks. Diploma.

A. F. Mayher & Co., 54 Vesey street, N. Y., for the best three hay forks. Diploma.

A. F. Mayher & Co., 54 Vesey street, N. Y., for the best farm harrow. Silver medal.

Elbert White, Stamford, Conn., for the best horse rake. Silver medal.

A. F. Mayher & Co., 54 Vesey street, N. Y., for the best farm and road scraper. Bronze medal.

A. F. Mayher & Co., 54 Vesey street, N. Y., for the best horse hoe. Silver medal.

Coleman Farm Mill Co., for the best horse power mill. Silver medal.

Charles E. Pease, Albany, N. Y., for the best horse power. Bronze medal.

Treadwell & Pell, 45 Fulton street, N. Y., for the best horse power corn sheller. Bronze medal.

George Green, Galesburg, Illinois, for the best churn. Bronze medal.

Theodore Teed, Croton, N. Y., for the best hurdle fence. Bronze medal.

Charles V. Mapes, corner Beekman and Nassau street, N. Y., for the best ox yoke. Diploma.

Charles V. Mapes, corner Beekman and Nassau street, N. Y., for the best subsoil plow. Silver medal.

Sandford & Price, Newark, N. J., for Tobias smut machine. Diploma.

W. T. Armstrong, Sandwich, Illinois, for a washing machine. Diploma.

Hydraulic Drain Tubing Co., 9 Carmine street, N. Y., for subsoil draining tile. Bronze medal.

James N. Edney, 147 Chambers street, N. Y., for a double-acting force pump. Diploma.

Treadwell & Pell, 45 Fulton street, N. Y., for a straight draft plow. Diploma.

R. S. Stenton, 229 Pearl street, N. Y., for well constructed plows. Bronze medal.

Jas. J. Mapes, Newark, N. J., C. V. Mapes (agent), corner Beekman and Nassau street, N. Y., for labor-saving farm implements, constructed with considerable ingenuity. Silver medal.

C. V. Mapes, corner Nassau and Beekman street, N. Y., for Lashe's patent spring plow, for rough, stony, or stumpy ground. Bronze medal.

Treadwell & Pell, 45 Fulton street, N. Y., for Share's coulter harrow. Bronze medal.

AGRICULTURAL AND HORTICULTURAL DEPARTMENT, PALACE GARDEN.

GRAIN.

Judges—E. T. Reaney, D. A. Eldridge, F. A. Esty.

Thomas Messenger, Great Neck, Queens county, N. Y., for the best barrel of red winter wheat. Silver cup, $15.

E. S. Elting, New Paltz Landing, Ulster county, N. Y., for the best barrel of spring wheat. Silver cup, $15.

O. J. Tillson, New Paltz Landing, Ulster county, N. Y., for the best barrel of white rye. Silver cup, $10.

Wm. S. Carpenter, 468 Pearl street, N. Y., for the second best white rye. Large silver medal.

S. D. Crispell, Hurley, Ulster county, N. Y., for a bag of black rye. Transactions Am. Institute.

FLOUR.

Judges—John M. Sands, Stephen Bonnel.

Hecker & Brother, 201 Cherry street, N. Y., for the best barrel wheat flour. Silver cup, $10.

Ross & Demott, 212 East 25th street, N. Y., for the second best barrel of flour. Silver medal.

Nason & Collins, 23 Water street, N. Y., for the third best barrel of flour. Diploma.

E. H. Griffith & Co., Nassau Mills, Rensselaer county, N. Y. (Beyer & Birdsall, agents, 267 Sixth avenue), for the best barrel of rye flour. Large silver medal.

John Groman, Lambertville, N. J. (Samuel Metters & Sons, agents, 120 West street, N. Y.), for the best barrel of corn meal. Large silver medal.

BUTTER.

Judges—Wm. S. Badeau, Wm. J. Young.

Miss Emily A. Tanner, Clarkstown, Rockland county, N. Y., for the best butter. Silver cup, $8.

WINE.

Judges—P. W. Engs, C. V. De Forest, Geo. H. Geib.

F. A. Rockwell, Ridgefield, Conn., for the best sample of native wine. Gold medal.

F. A. Rockwell, Ridgefield, Conn., for the best sample of blackberry wine. Large silver medal.

Alfred Speer, Passaic, N. J., for the best elderberry wine. Diploma.

PICKLES AND PRESERVES.

Judges—F. A. Rockwell, L. L. Bartlett, Wm. S. Carpenter.

J. B. Schoonmaker, 947 Broadway, N. Y., for the best assortment of pickles. Silver medal.

A. N. Thompson & Co., 221 and 223 Fulton street, N. Y., for the best assortment of hermetically sealed peaches, green corn, and tomatoes. Large silver medal.

Thompson & Totten, 127 Reade street, N. Y., for the second best assortment of hermetically sealed fruits. Silver medal.

ARTIFICIAL MANURES.

Jas. J. Mapes, Newark, N. J., for nitrogenized and improved superphosphate of lime. Large silver medal.

FRUIT.

First series.

Judges—Dan'l T. Bragane, Gabriel Marc, A. S. Fuller.

Ellwanger & Barry, Rochester, N. Y., for the best general collection of named fruits. Silver cup, $20.

Wm. S. Carpenter, 468 Pearl street, for the second best collection of named fruits. Large silver medal.

Wm. S. Carpenter, 468 Pearl street, for the best twelve named varieties of apples. Large silver medal.

Joseph Parker, West Rupert, Vt., for the second best twelve named varieties of apples. Silver medal.

Wm. S. Carpenter, 468 Pearl street, for the best six named varieties of apples. Silver medal.

Convis Parker, West Rupert, Vt., for the best twelve table apples, one variety. Book premium.

Mrs. De Voe, 13th street, N. Y., for the second best twelve table apples, one variety. Book premium.

W. L. Ferris, Throgg's Neck, Westchester county, for the best twelve named varieties of pears. Large silver medal.

A. A. Leverich, Broadway, Brooklyn, L. I., for the best six named varieties of pears. Silver medal.

A. Richardson, 385 Grand street, Williamsburgh, L. I., for the second best six named varieties of pears. Book premium.

A. A. Leverich, Broadway, Brooklyn, L. I., for the best twelve quinces. Book premium.

W. Edwards, Westchester, N. Y., for the second best twelve quinces. Book premium.

J. C. Rennison, gardener to C. W. Grant, Iona, near Peekskill, N. Y., for the best four named varieties of native grapes. Large silver medal.

J. Couzens, Dobb's Ferry, Westchester county, N. Y., for the best twelve bunches of Isabella grapes. Silver medal.

Timothy Ryan, gardener to C. H. Lilienthal, Yonkers, N. Y., for the best four named varieties of foreign grapes. Silver cup, $10.

Mrs. Durfee, Fall River, Mass., for the second best four named varieties of foreign grapes. Silver medal.

Mrs. Durfee, Fall River, Mass., for the best two bunches black Hamburg grapes. Silver medal.

Mrs. Durfee, Fall River, Mass., for the best two bunches of any other variety of foreign grapes (Cannon Ball Muscat). Silver medal.

N. Halley, Flushing Bay, L. I., for the best three water melons. Book premium.

H. Eastmond, New Monmouth, N. J., for Japanese apple melon. Diploma.

Amateur's List.

H. Tanner, Brooklyn, L. I., for the best four varieties of pears. Silver medal.

H. Tanner, Brooklyn, L. I., for the best six bunches Isabella grapes. Silver medal.

Second series.

Judges—Peter B. Mead, Isaac Buchanan.

Wm. S. Carpenter, 468 Pearl street, for the best twelve named varieties of table apples. Large silver medal.

C. M. Hovey, Boston, Mass., for the best collection of fifty named varieties of pears. Silver cup, $15.

W. L. Ferris, Throgg's Neck, Westchester county, N. Y., for the second best collection of fifty named varieties of pears. Large silver medal.

P. T. Quinn, sup't for Prof. J. J. Mapes, Newark, N. J., for the best twelve named varieties of pears. Large silver medal.

Dennis Murphy, gardener to E. A. Stevens, Hoboken, N. J., for the second best twelve named varieties of pears. Silver medal.

Dennis Murphy, gardener to E. A. Stevens, Hoboken, N. J., for the best six named varieties of pears. Silver medal.

A. Douglass, Jersey City, N. J., for the best twelve quinces. Book premium.

J. C. Rennison, gardener to C. W. Grant, Iona, near Peekskill, N. Y., for the best four named varieties of native grapes. Large silver medal.

J. Couzens, Dobb's Ferry, N. Y., for the best twelve bunches of Isabella grapes. Silver medal.

R. T. Underhill, Croton Point, Westchester county, N. Y., for the second twelve best bunches of Isabella grapes. Book premium.

R. T. Underhill, Croton Point, Westchester county, N. Y., for the best twelve bunches of Catawba grapes. Silver medal.

Amateur's List.

David Parker, West Rupert, Vt., for the best four varieties of apples. Silver medal.

H. Tanner, gardener to J. S. T. Stranahan, Brooklyn, L. I., for the best six bunches of Isabella grapes. Silver medal.

Edward Archer, West Hackensack, N. J., for the second best six bunches of Isabella grapes. Book premium.

H. Tanner, gardener to J. S. T. Stranahan, Brooklyn, L. I., for the best six bunches of Catawba grapes. Silver medal.

Special List.

Timothy Ryan, gardener to C. H. Lilienthal, Yonkers, N. Y., for a very fine specimen of the smooth-leaved Cayenne pine apple. Silver medal.

Elbert Bogert, Roslyn, L I., for several varieties of apples. Diploma.

Abraham Brower, 257 Henry street, for a specimen of figs. Diploma.

F. A. Rockwell, Ridgefield, Conn., for fine specimens of the "Baker apple." Diploma.

Third series.

Judges—L. A. Roberts, Wm. Cranstoun.

Wm. S. Carpenter, 468 Pearl street, for the best general collection of fruits. Silver cup, $20.

Wm. S. Carpenter, 468 Pearl street, for the best twelve varieties of apples. Large silver medal.

Wm. S. Carpenter, 468 Pearl street, for the best six varieties of apples. Silver medal.

Dennis Murphy, gardener to E. A. Stevens, Hoboken, N. J., for the best twelve varieties of pears. Large silver medal.

P. T. Quinn, sup't for Prof. J. J. Mapes, Newark, N. J., for the best six varieties of pears. Silver medal.

Dennis Murphy, gardener to E. A. Stevens, Hoboken, N. J., for the second best six varieties of pears. Book premium.

Henry Steele, Jersey City, for the best twelve quinces. Book premium.

J. C. Young, Lakeland, L. I., for the best peck a cranberries. Silver medal.

J. Couzens, Dobb's Ferry, N. J., for the best twelve bunches Isabella grapes. Silver medal.

Amateur's List.

Joseph Bartlett, Hart's Village, Washington, Dutchess county, N. Y., for the best Isabella grapes. Silver medal.

H. Tanner, gardener to J. S. T. Stranahan, Brooklyn, L. I., for the second best Isabella grapes. Book premium.

Joseph Bartlett, Hart's Village, Washington, Dutchess county, N. Y., for the best Catawba grapes. Silver medal.

Edward Richards, Mott Haven, N. Y., for the second best Catawba grapes. Book premium.

H. Tanner, gardener to J. S. T. Stranahan, Brooklyn, L. I., for the best four varieties of pears. Silver medal.

FLOWERS.

First series.

Judges—Arthur Ofield, Francis Norton, John A. Mason.

C. S. Pell, N. Y. Orphan Asylum, for the best display of cut flowers. Silver cup, $10.

A. G. Burgess, East New York, for the best general display of dahlias. Silver cup, $8.

A. Richardson, Fordham, N. Y., for the best fifty dahlias. Silver cup, $10.

Mateo Donadi, Astoria, L. I., for the second best fifty dahlias. Silver medal.

A. Richardson, Fordham, N. Y., for the best twenty-four dahlias. Silver medal.

Mateo Donadi, Astoria, L. I., for the second best twenty-four dahlias. Book premium.

A. Richardson, Fordham, N. Y., for the best seedling dahlias. Diploma.

M. Donadi, Astoria, L. I., for the best twelve named roses, three of each. Large silver medal.

M. Donadi, Astoria, L. I., for the best display of carnations. Silver medal.

C. S. Pell, N. Y. Orphan Asylum, for the second best display of carnations. Book premium.

J. Chevalier & Petit, 815 Broadway, N. Y., for the best pair of hand bouquets. Silver medal.

J. Chevalier & Petit, 815 Broadway, N. Y., for the best parlor bouquet. Silver medal.

J. Chevalier & Petit, 815 Broadway, N. Y., for the best floral basket. Large silver medal.

P. Brunner, Llewellyn Park, Orange, N. J., for the best floral design. Silver cup, $15.

Amateur's List.

A. Richardson, Fordham, N. Y., for the best twenty dahlias. Silver medal.

C. S. Pell, N. Y. Orphan Asylum, for the second best twenty dahlias. Book premium.

A. Richardson, Fordham, N. Y., for the best twelve dahlias. Silver medal.

C. S. Pell, N. Y. Orphan Asylum, for the second best twelve dahlias. Book premium.

Second series.

Judges—Wm. J. Davidson, Generius Gabrielson.

T. Cavanach, Brooklyn, L. I., for the best collection of cut flowers. Mr. Cavanach, being an employee, is debarred from receiving a premium, by the rules of the Institute.

C. S. Pell, N. Y. Orphan Asylum, for a collection of cut flowers. Silver medal.

Mateo Donadi, Astoria, L. I., for the best general display of dahlias. Silver cup, $8.

C. S. Pell, N. Y. Orphan Asylum, for the second best display of dahlias. Silver medal.

Mateo Donadi, Astoria, L. I., for the best fifty blooms of dahlias. Silver cup, $10.

C. S. Pell, N. Y. Orphan Asylum, for the second best fifty blooms of dahlias. Silver medal.

Mateo Donadi, Astoria, L. I., for the best twenty-four blooms of dahlias. Silver medal.

P. Brunner, gardener at Llewellyn Park, Orange, N. J., for the second best twenty-four blooms of dahlias. Book premium.

Mateo Donadi, Astoria, L. I., for the best twelve named roses. Large silver medal.

C. S. Pell, N. Y. Orphan Asylum, for the best display of roses. Silver medal.

Mateo Donadi, Astoria, L. I., for the best display of carnations. Silver medal.

C. S. Pell, N. Y. Orphan Asylum, for the second best display of carnations. Book premium.

C. S. Pell, N. Y. Orphan Asylum, for the best collection of plants. Silver medal.

John Cranstoun, Hoboken, N. J., for the best pair of hand bouquets. Silver medal.

P. Brunner, gardener at Llewellyn Park, Orange, N. J., for the best floral design. Silver cup, $15.

D. Murphy, Brooklyn, L. I., for the second best pair of hand bouquets. Book premium.

Amateur's List.

C. S. Pell, N. Y. Orphan Asylum, for the best twenty blooms of dahlias. Silver medal.

C. S. Pell, N. Y. Orphan Asylum, for the best twelve blooms of dahlias. Silver medal.

Third series.

Judges—Jas. Knight, Andrew Bridgeman.

Wm. H. Mitchell, Harlem, N. Y., for the best display of cut flowers. Silver cup, $10.

T. Cavanach, Bond street, Brooklyn, for the second best display of cut flowers. Mr. Cavanach being an employee, is debarred from receiving a premium by the rules of the Institute.

C. S. Pell, N. Y. Orphan Asylum, for the best general display of dahlias. Silver cup, $8.

P. Brunner, gardener to Llewellyn Park, Orange, N. J., for the second best display of dahlias. Silver medal.

C. S. Pell, N. Y. Orphan Asylum, for the best fifty blooms of dahlias. Silver cup, $10.

Mateo Donadi, Astoria, L. I., for the second best fifty blooms of dahlias. Silver medal.

C. S. Pell, N. Y. Orphan Asylum, for the best twenty-four blooms of dahlias. Silver medal.

Mateo Donadi, Astoria, L. I., for the second best twenty-four blooms of dahlias. Book premium.

Mateo Donadi, Astoria, L. I., for the best seedling dahlias. Diploma.

Mateo Donadi, Astoria, L. I., for the best twelve named roses. Large silver medal.

C. S. Pell, N. Y. Orphan Asylum, for the best display of carnations. Silver medal.

T. Cavanach, Brooklyn, L. I., for the best display of cut Chrysanthemums. Mr. Cavanach being an employee, is debarred from receiving a premium, by the rules of the Institute.

C. S. Pell, N. Y. Orphan Asylum, for the second best display of cut Chrysanthemums. Book premium.

C. S. Pell, N. Y. Orphan Asylum, for the best display of Chrysanthemums in pots. Silver medal.

Wm. H. Mitchell, Harlem, N. Y., for the best pair of hand bouquets. Silver medal.

P. Brunner, gardener at Llewellyn Park, Orange, N. J., for the best floral design. Silver cup, $15.

Amateur's List.

C. S. Pell, N. Y. Orphan Asylum, for the best display of cut flowers. Silver medal.

C. S. Pell, N. Y. Orphan Asylum, for the best twenty dahlias. Silver medal.

C. S. Pell, N. Y. Orphan Asylum, for the best twelve dahlias. Silver medal.

C. S. Pell, N. Y. Orphan Asylum, for the best display of roses. Silver medal.

C. S. Pell, N. Y. Orphan Asylum, for the best display of carnations. Diploma.

H. Tanner, gardener to J. S. T. Stranahan, Brooklyn, N. Y., for the best pair of hand bouquets. Silver medal.

VEGETABLES.

First series.

Judges—Francis Briell, P. T. Quinn, John S. Burgess.

S. Ruth, gardener to R. G. Walmsley, Blackwell's Island, for the best assortment of culinary vegetables. Silver cup, $10.

N. Halley, gardener to Mrs. Strong, Flushing Bay, L. I., for the second best assortment of culinary vegetables. Silver medal.

S. Ruth, gardener to R. G. Walmsley, Blackwell's Island, for the best collection of vegetable roots for cattle. Silver medal.

N. Halley, gardener to Mrs. Strong, Flushing Bay, L. I., for the second best collection of vegetable roots for cattle. Book premium.

S. Ruth, gardener to R. G. Walmsley, Blackwell's Island, for the best twelve long blood beets. Book premium.

J. Lantry, gardener to J. C. Beekman, 63d street, E. R., for the second best twelve long blood beets. Book premium.

S. Ruth, gardener to R. G. Walmsley, Blackwell's Island, for the best twelve turnip beets. Book premium.

N. Halley, gardener to Mrs. Strong, Flushing Bay, L. I., for second best twelve turnip beets. Book premium.

S. Ruth, gardener to R. G. Walmsley, Blackwell's Island, for the best twelve carrots. Book premium.

N. Halley, gardener to Mrs. Strong, Flushing Bay, L. I., for second best twelve carrots. Book premium.

Timothy Ryan, gardener to C. H. Lilienthal, Yonkers, N. Y., for the best four heads of drumhead cabbage. Book premium.

N. Halley, gardener to Mrs. Strong, Flushing Bay, L. I., for the best heads of Savoy cabbage. Book premium.

N. Halley, gardener to Mrs. Strong, Flushing Bay, L. I., for the best six roots of solid celery. Book premium.

J Lantry, gardener to J. C. Beekman, 63d street, E. R., for the second best six roots of solid celery. Book premium.

J. Lantry, gardener to J. C. Beekman, 63d street, E. R., for the best two purple egg plants. Book premium.

De Witt C. Morris, Cedar Park, Bergen Point, N. J., for the second best two purple egg plants. Book premium.

N. Halley, gardener to Mrs. Strong, Flushing Bay, L. I., for the best peck of red onions. Book premium.

Henry Tyson, 71st street, Yorkville, N. Y., for the best peck of tomatoes. Book premium.

N. Halley, gardener to Mrs. Strong, Flushing Bay, L. I., for the second best peck of tomatoes. Book premium.

Wm. S. Carpenter, 468 Pearl street, N. Y., for the best collection of named varieties of potatoes. Silver medal.

J. Lantry, gardener to J. C. Beekman, 63d street, E. R., for the second best collection of named varieties of potatoes. Book premium.

Wm. S. Carpenter, 468 Pearl street, N. Y., for the best three oval squashes. Book premium.

S. Ruth, gardener to R. G. Walmsley, Blackwell's Island, for the best three crookneck squashes. Book premium.

J. Lantry, gardener to J. C. Beekman, 63d street, E. R., for the best three pumpkins for table. Book premium.

N. Halley, gardener to Mrs. Strong, Flushing Bay, L. I., for the best twenty ears of sweet corn. Book premium.

Wm. S. Carpenter, 468 Pearl street, for the best collection of squashes. Diploma.

Wm. S. Carpenter, 468 Pearl street, for a collection of corn. Diploma.

S. Ruth, gardener to R. G. Walmsley, Blackwell's Island, for twelve long smooth parsnips. Diploma.

Second series.

Judges—Richard Mullan, Chas. S. Pell.

S. Ruth, gardener to R. G. Walmsley, Blackwell's Island, for the best assortment of culinary vegetables. Silver cup, $10.

S. Ruth, gardener to R. G. Walmsley, Blackwell's Island, for the best collection of vegetable roots for cattle. Silver medal.

S. Ruth, gardener to R. G. Walmsley, Blackwell's Island, for the best twelve long blood beets. Book premium.

Robert Alexander, gardener to J. G. Bennett, Fort Washington, N. Y., for the second best twelve long blood beets. Book premium.

S. Ruth, gardener to R. G. Walmsley, Blackwell's Island, for the best twelve turnip blood beets. Book premium.

Robert Alexander, gardener to J. G. Bennett, Fort Washington, N. Y., for the second best twelve turnip blood beets. Book premium.

J. Devin, gardener to B. M. Whitlock, Hammock, Westchester county, N. Y., for the best twelve carrots for table. Book premium.

S. Ruth, gardener to R. G. Walmsley, Blackwell's Island, for the second best twelve carrots for the table. Book premium.

J. Devin, gardener to B. M. Whitlock, Hammock, Westchester county, N. Y., for the best four drumhead cabbages. Book premium.

S. Ruth, gardener to R. G. Walmsley, Blackwell's Island, for the best six roots of solid celery. Book premium.

P. T. Quinn, sup't for Prof. J. J. Mapes, Newark, N. J., for the second best six roots of solid celery, Book premium.

P. T. Quinn, sup't for Prof. J. J. Mapes, Newark, N. J., for the best two purple egg plants. Book premium.

J. Devin, gardener to B. M. Whitlock, Hammock, Westchester county, N. Y., for the second best two purple egg plants. Book premium.

Robert Alexander, gardener to J. G. Bennett, Fort Washington, N. Y., for the best peck of white onions. Book premium.

Robert Alexander, gardener to J. G. Bennett, Fort Washington, N. Y., for the best peck of yellow onions. Book premium.

J. Lantry, gardener to J. C. Beekman, 65th street, E. R., for the best peck of red onions. Book premium.

J. Lantry, gardener to J. C. Beekman, 65th street, E. R., for the best peck of tomatoes. Book premium.

S. Ruth, gardener to R. G. Walmsley, Blackwell's Island, for the second best peck of tomatoes. Book premium.

Wm S. Carpenter, 468 Pearl street, N. Y., for the best collection of named varieties of potatoes. Silver medal.

S. Ruth, gardener to R. G. Walmsley, Blackwell's Island, for the best half bushel of potatoes for the table. Book premium.

P. T. Quinn, sup't for Prof. J. J. Mapes, Newark, N. J., for the second best half bushel of potatoes for the table. Book premium.

Edward Archer, West Hackensack, N. J., for the best three oval-shaped custard squashes. Book premium.

S. Ruth, gardener to R. G. Walmsley, Blackwell's Island, for the best three crookneck squashes. Book premium.

Frederick Selchen, Mount Vernon, Westchester county, N. Y., for the best and largest pumpkin. Book premium.

P. T. Quinn, sup't for Prof. J. J. Mapes, Newark, N. J., for the best twenty ears of sweet corn. Book premium.

Wm. S. Carpenter, 468 Pearl street, N. Y., for varieties of musk melon. Book premium.

Wm. S. Carpenter, 468 Pearl street, N. Y., for twenty-one varieties of tomatoes. Book premium.

P. T. Quinn, sup't for Prof. J. J. Mapes, Newark, N. J., for twenty ears of white (field) corn. Book premium.

Third series.

Judges—Wm. Haley, Dennis Murphy.

S. Ruth, gardener to R. G. Walmsley, Blackwell's Island, for the best collection of culinary vegetables. Silver cup, $10.

Jas. F. O'Rourke, Irvington, N. J., for the second best collection of culinary vegetables. Silver medal.

S. Ruth, gardener to R. G. Walmsley, Blackwell's Island, for the best collection of roots for cattle. Silver medal.

S. Ruth, gardener to R. G. Walmsley, Blackwell's Island, for the best six heads of celery. Book premium.

S. Ruth, gardener to R. G. Walmsley, Blackwell's Island, for the best peck of tomatoes. Book premium.

S. Ruth, gardener to R. G. Walmsley, Blackwell's Island, for the best long blood beets. Book premium.

S. Ruth, gardener to R. G. Walmsley, Blackwell's Island, for the best twelve table carrots. Book premium.

S. Ruth, gardener to R. G. Walmsley, Blackwell's Island, for the best twelve parsnips. Transactions Am. Institute.

Wm. S. Carpenter, 468 Pearl street, N. Y., for the best three oval squashes. Book premium.

D. R. Paulsgraf, West Farms, Westchester county, N. Y., for the best three custard squashes. Book premium.

G. L. Cook & Co., New Haven, Conn., for the best collection of potatoes. Silver medal.

W. S. Carpenter, 468 Pearl street, N. Y., for the second best collection of potatoes. Book premium.

E. Archer, West Hackensack, N. J., for a half bushel of long white turnips. Book premium.

E. E. Clark, New Haven, Conn., for a display of dioscorea batetas. Diploma.

G. L. Cook & Co., New Haven, Conn., for two varieties of seedling potatoes. Diploma.

MANUFACTURING AND MECHANICAL DEPARTMENT.

AGRICULTURAL IMPLEMENTS.

Judges—John Harold, Henry R. Westervelt, Edward Ralph, Jr.

John McNally, 197 and 550 Water street, for an assortment of agricultural implements. Silver medal.

Chas. V. Mapes, corner Beekman and Nassau streets, for an assortment of agricultural implements. Bronze medal.

Chas. V. Mapes, corner Beekman and Nassau streets, N. Y., for the best horse corn planter. Diploma.

Chas. V. Mapes, corner Beekman and Nassau streets, for the best hand seed drill. Diploma.

A. F. Mayher & Co., 54 Vesey street, N. Y., for the best potato digger. Diploma.

A. F. Mayher & Co., 54 Vesey street, N. Y., for the best straw and stalk cutter (Daniels' patent). Diploma.

R. S. Stenton, 229 Pearl street, N. Y., for the best cast-steel prairie plow. Diploma.

Isaac Rulosson, 341 Eighth avenue, for a straight draft plow for general use. Diploma.

T. S. Scoville, 15 Laight street, N. Y., for a rotary subsoil plow. Diploma.

Chas. V. Mapes, corner Beekman and Nassau streets, N. Y., for the best cider mill. Diploma.

Chas. V. Mapes, corner Beekman and Nassau streets, for the "Excelsior" fanning mill. Diploma.

Chas. V. Mapes, corner Beekman and Nassau streets, for patent edge scythes. Diploma.

E. D. Davis, 52 Fulton street, N. Y., for the best hand cap glass for gardens. Diploma.

John Bell, Fourth avenue, corner East 131st street, Harlem, for Bell's patent berry boxes. Diploma.

A. F. Mayher & Co., 54 Vesey street, N. Y., for the best pruning tools. Diploma.

Henry Steele, Jersey City, N. J., for a bee protector. Diploma.

Owen Stoddard, Busti, Chautauqua county, N. Y., for an improved method of adding friction rollers to the cutter bar, lessening the draft and friction of mowing machines. Diploma.

E. J. & A. W. Jerome, Mineola, L. I., for an improvement in the adjustment of the reels of mowing machines. Diploma.

Discretionary.

A. W. Morse, Canastota, N. Y., for a clod crusher. Diploma.

BELLS.

Discretionary.

J. P. Cordman, Brooklyn (S. A. Heath & Co., agents, 37 Park Row), for an automatic bell. Diploma.

BOOK-BINDING AND STATIONERY.

Discretionary.

Chas. W. Bleecker, 18 William street, N. Y., for a skeleton ledger. Diploma.

John L. Rowe, 421 Ninth avenue, for a pen wiper and paper weight combined. Diploma.

E. & J. B. Platt, Augusta, Ga., for a portable copying press. Diploma.

BOOTS AND SHOES.

Ladies'.

Judges—Benjamin Coyte, John Dunham.

J. B. Miller, 387 Canal street, for excellent specimens of ladies' boots and shoes. Diploma.

Gentlemen's.

Judges—Isaac E. Tate, S. Cahill.

J. L. Watkins, 114 Fulton street, for the best fishing and hunting boots. Diploma.

BRUSHES.

Judges—Geo. Timpson, J. C. Baldwin.

T. W. Hill, 165 William street, for the best tooth and toilet brushes Diploma.

BUILDING MATERIALS.

Judges—Chas. T. Bunting, Wyllis Blackstone.

A. L. Osborn, 414 Canal street, for superior cement roofing. (A silver medal having been before awarded.) Diploma.

E. E. & J. F. Ellery, 596 Grand street, for an excellent specimen of India rubber coated iron roofing. Diploma.

Johns & Crosley, 510 Broadway, for an excellent specimen of gutta percha cement roofing. Diploma.

Chas. Douglas, Hebron, Conn., for an iron chimney cap. Diploma.

Knight & Crawford, Jersey City, N. J., for the best drain pipe. Bronze medal.

Washington Smith, 259 West 19th street, for the second best drain and ventilating pipe. Diploma.

M. W. Scott, 35 Cedar street, for the best iron fire and burglar proof window blind. Silver medal.

A. M. Cochran, 274 West 35th street, for the second best iron fire and burglar proof window blind. Bronze medal.

Penrhyn Mantel and Slate Co., 268 and 270 Canal street, for superior slate mantels and table tops. Silver medal.

John Clark, 44 Tenth street, Brooklyn, for a blind slat operator. Diploma.

C. Gies, 233 Ninth avenue, for a water-tight washstand. Bronze medal.

BURIAL CASES.

Judges—B. Garvey, H. L. Stuart, Thos. P. How.

Penrhyn Mantel and Slate Co., 268 and 270 Canal street, for the best burial cases. Bronze medal.

H. Marshall, Cincinnati, Ohio, for cast and wrought iron burial cases. Diploma.

CARRIAGES AND SLEIGHS.

Judges—Wm. Flandrau, Chas. Beardsley.

Brewster & Co., 372 Broome street, for the best light road wagon. Silver medal.

Stivers & Smith, 89 Eldridge street, for the best top wagon and sleigh. Silver medal.

F. G. Todd, 102 Nassau street, for the best carriage jack. Diploma.

Isaac B. Kilburn, Newark, N. J., for the best bend work for carriages. Diploma.

A. P. Moriarty, 575 Hudson street, for painting on hose carriage. Silver medal.

CARVING, ETC.

Judges—John Stevens, John Johnson.

John W. Clark, 627 Hudson street, for specimens of carving. Diploma.

R. B. Smith, 85 Portland avenue, Brooklyn, L. I., for base ball insignia. Diploma.

Lawrence Holmes, Paterson, N. J., for match splints. Diploma.

CLOCKS AND WATCHES.

Judges—Henry Glover, Felix A. Finn.

E. Howard & Co., Boston, Mass., (W. H. Willson, agent, 170 Broadway,) for the best watches. Gold medal.

American Watch Co., Waltham, Mass. (Robinson & Appleton, agents, 182 Broadway), for superior watches and watch dials. (A gold medal having been before awarded.) Diploma.

John M. Batchelder, Boston, Mass., for a railroad time-keeper. Diploma.

CLOTHING.

Judges—F. S. Kirtland, T. E. Bacon, John T. Henry.

Edward J. Olsson, Jr., 364 Bowery, for the best ready-made boys' clothing. Bronze medal.

Mrs. Herring, 68 Charles street, for a beautiful specimen of work on a waistcoat. Diploma.

CONFECTIONERY, CAKE, ETC.

Judges—John R. Treadwill, Chas. A. Seely.

Thomas & Co., 546 Broadway, for the best specimen of assorted candies. Diploma.

C. Hitzelberger, 206 Eighth avenue, for the best specimens of cake and ornamental confectionery. Diploma.

COOPER'S WORK.

Judges—M. P. Bensel, Geo. Beton.

J. B. & M. B. Terhune, 98 Murray street, for superior white oak kegs. Diploma.

Discretionary.

John G. Stephenson, Buffalo, N. Y., for specimens of staves, the edges dressed by machinery. Diploma.

COTTON GOODS.

Judges—P. F. Randolph, F. T. Wilkins.

Wm. A. Howard, Providence, R. I. (Hoyt, Sprague & Co., agents, 56 Park Place), for superior bleached muslins. Diploma.

Garsed & Brothers, Frankfort, Pa., for very superior tickings and checks. Silver medal.

Phenix Manufacturing Co., John H. Sprague, president, Paterson, N. J., (Wm. de Groot, agent, 130 Front street,) for specimens of cotton duck. Diploma.

J. R. Harrington, 62 Warren street, for superior carpet linings and millinet wadding. Diploma.

CUTLERY, EDGE TOOLS, ETC.

Judges—John M. Boyd, H. A. Patterson, Henry Cromwell.

R. Heinisch, corner Nassau and Fulton streets, for the best specimens of tailor's shears. (A gold medal having been before awarded.) Diploma.

Wendt & Seymour, 52 Beekman street, for the second best specimens tailor's shears. Bronze medal.

A. Bridges & Co., 64 Cortlandt street, for the best shears for cutting metals. Diploma.

Clarenbach & Herder, Philadelphia, Pa., for the best skates. Diploma.

Edward Belew, 14 Platt street, for a mode of fastening skates. Diploma.

Henry Nelson, 103 East 32d street, for the best steel tools. Diploma.

H. Sauerbier, Newark, N. J., for tools for working leather. Diploma.

The Dunn Edge Tool Co., West Waterville, Maine (U. L. Hitchcock, agent, 260 Canal street), for axes and scythes. Diploma.

Jas. H. Roome, 5 Hamersley street, for tailor's shears. Diploma.

DENTISTRY.

Judges—A. C. Hawes, J. Smith Dodge, T. H. Burras.

Jones & White, 335 Broadway, N. Y., for the best specimens of artificial teeth. (A gold medal having been before awarded.) Diploma.

Orum & Armstrong, Philadelphia, Pa. (Sutton & Raynor, agents, 609 Broadway), for the second best specimens of artificial teeth. Bronze medal.

E. A. L. Roberts, 56 Bond street, for a dental furnace. Bronze medal.

Wm. C. Tracy, 375 Broadway, for the best specimen of carved block teeth. Silver medal.

Warren & Banks, 142 Centre street, for the best vulcanizing machine. Diploma.

DRUGS AND CHEMICALS.

Judges—Isaiah Deck, Chas. A. Seely, J. C. Hart, Joseph Yates.

The N. Y. Paraffine Candle Co., 16 Beekman street, for Paraffine candles. Silver medal.

J. C. & D. Pennington, Hoboken, N. J., for hyposulphite of soda. Silver medal.

Boyd & Co., 249 Pearl street, N. Y., for the best coal oil. Silver medal.

East Cambridge Coal Oil Co., Boston, for the second best coal oil. Bronze medal.

Syddon & Yenni, 134 Maiden Lane, N. Y., for the third best coal oil. Diploma.

Joseph Dixon & Co., Jersey City, N. J., for carburet of iron stove polish. Bronze medal.

Henry C. Spalding, 34 Platt street, for the best liquid glue. Bronze medal.

J. L. McCutcheon, 170 Myrtle avenue, Brooklyn, L. I., for the second best liquid glue. Diploma.

H. O. Hepburn & Co., 73 Liberty street, for solidified milk. Bronze medal.

A. Cunningham, 30 Water street, N. Y., for oxychloride of lead. Bronze medal.

James R. Dey & Co., 66 Cortlandt street, for strela matches. Diploma.

Battelle & Renwick, 163 Tenth street, for saltpetre. (A silver medal having been before awarded.) Diploma.

D. B. Coles & Son, Newark, N. J., for prussiate of potash. Bronze medal.

Porter & Fairchild, 195 Sixth avenue, for specimens of perfumery. Diploma.

Stimson, Valentine & Co., Boston, Mass., for varnishes. Diploma.

R. B. Watmough, 27 John street, for wax matches. Diploma.

Valentine H. Quinby, 173 Chambers street, for the best yeast, or baking powders. Diploma.

Lewis Feuchtwanger, 143 Maiden Lane, for chemicals. Bronze medal.

Discretionary.

John M. Fowler & Co., for a beautifier for patent leather. Diploma.

ENGRAVING.

Judges—Geo. Timpson, John W. Chambers, Jas. C. Baldwin.

Sarony, Major & Knapp, 449 Broadway, for the best specimens of lithography. Large silver medal.

R. Purcell, 378 Broadway, for a specimen of engraving on pine wood. Bronze medal.

Dempsey & Fargis, 603 Broadway, for superior specimens of wedding and visiting card engraving, and stamped initials on envelopes. Diploma.

F. F. Hewitt, 298 and 315 Broadway, for specimens of business card engraving. Diploma.

FINE ARTS.

Judges—Wm. Gibson, J. K. Fisher.

David Richards, Cooper Institute, for a marble bust of Peter Cooper. Bronze medal.

J. & R. Lamb, 126 Mac Dougal street, for a fine specimen of artificial marble. (A silver medal having been before awarded,) Diploma.

Leonard Virolet, 192 Second street, Brooklyn, L. I., for flower paintings in water colors. Diploma.

John B. Christoffel, 21 City-Hall Place, for a bronze figure. Bronze medal.

Otto Fuchs, 418 Second Avenue, for a well-drawn hand map. Diploma.

S. W. Pearsall, 197 Chrystie street, for a specimen of Japan pearl flower painting on hose carriage No. 50. Bronze medal.

FIRE ARMS.

Judges.—J. C. Cary, Geo. H. Reynolds.

F. D. Newbury, Albany, New York, for the best revolving pistol. Silver medal.

Allen & Wheelock, Worcester, Mass., for a fine collection of patent revolvers. Silver medal.

J. P. Wilson, Dion, N. Y., for a patent burglar alarm gun and pocket pistol. Diploma.

FURNITURE.

Judges.—John Ash, Geo. Braker.

E. C. Woodbridge, 6 Sullivan street, for the best enamelled furniture. Silver medal.

J. M. Edwards, 634 Broadway, N. Y., for the second best enameled furniture. Diploma.

Geo. Schott, 512 Broadway, for the best spring bed bottom. Bronze medal.

J. Lippincott, 646 Broadway, for the second best spring bed bottom. Diploma.

Mills & Co., No. 678 Broadway, for a self-ventilating spring bed. Diploma.

H. L. Thistle, 85 Bleecker street, for a superior secretary book case bedstead. Silver medal.

D. S. Gregory & Co., Jersey city, for sand paper. Diploma.

IRON FURNITURE.

Discretionary.

Hutchinson & Wickersham, 312 Broadway, for iron bedsteads. Diploma.

FISHING TACKLE.

Judges.—Thos. F. De Voe, Geo. Timpson.

T. & H. Pritchard, 86 Fulton street, for specimens of artificial flies. Diploma.

GLASS, CHINA, AND EARTHEN-WARE.

Discretionary.

Jersey City Crockery Company, Jersey City, N. J., for specimens of crockery. Silver medal.

Ostrander & Co., 148 Chambers street, for specimens of American china. Silver medal.

S. J. Pardessus, 156 William street, for superior glass shades. Silver medal.

Laurent & Rousseaux, East Brooklyn, L. I., for glass cylinders and corrugated glass. Silver medal.

GRAINING.

Judges.—Wm. Gibson, J. K. Fisher.

Farmer Bros., 629 Sixth Avenue, for the best imitations of woods and marbles. Diploma.

Thomas Flaherty, Andover, Mass., for imitations of rosewood. Diploma.

HATS.

E. Mullan, 88 Sixth avenue, for fancy military and gents.' hats. Diploma.

HARNESS, ETC.

Discretionary.

Daniel O'Leary, 9 Fulton avenue, Brooklyn, L. I., for a superior set of single harness. Silver medal.

James Neil, Yorkville, N. Y., for patent safety stirrups. Silver medal.

HORSE SHOES.

Judge—James Graley.

Bernard Deylon, Third avenue, corner East 60th street, for the best horse shoes. Bronze medal.

John H. Cooper, 109 East 28th street, for the second best horse shoes. Diploma.

HOUSEHOLD UTENSILS.

Judges—John C. Johnson, W. J. Barnes.

Shaler Carpet Sweeper Co., Chester, Conn., (J. Champion, agent, 278 Pearl street), for the best carpet sweeper. Bronze medal.

Hiram H. Herrick, Boston, Mass., for the second best carpet sweeper. Diploma.

William Vanderburg, 178 West 36th street, for an excellent ironing table. Diploma.

Samuel Booth, 109 Nassau street, for the best self-acting coal sifter. Bronze medal.

Allen Cummings, 420 Fourth avenue, for the second best self-acting coal sifter. Diploma.

Noah Mosher, Norwalk, Conn., for porcelain pails. Diploma.

De Witt Stevens, Newark, N. J., for a cheese cutter. Diploma.

J. S. Clough, 231 Pearl street, for the best fly trap. Diploma.

F. A. Cannon, 139 Broadway, for the best smoothing and polishing iron. Diploma.

E. P. Munroe, 463 Houston street, for an excellent egg beater. Diploma.

Bartlett & Lesley, 426 Broadway, for the best coffee pot. Silver medal.

Crandall Bros., 5 Columbia street, for the best hobby horses. Bronze medal.

A. M. Cochran, 274 West 35th street, for a self-acting rat trap. Diploma.

J. L. Rowe, 421 Ninth avenue, for an ice breaker. Diploma.

E. B. & P. C. Daniels, Owego, N. Y., for the best clothes dryer. Bronze medal.

John A. Morgan, 172 East 24th street, for the second best clothes dryer, Tift's patent. Diploma.

Discretionary.

D. W. Seeley, No. 34½ Pine street (A. F. Mayher & Co , agents, No. 54 Vesey street, for a superior washing machine. Diploma.

INDIA RUBBER AND GUTTA PERCHA.

Judges—Lewis Feuchtwanger, Alex. H. Everett, Isaiah Deck.

H. G. Norton, 100 Liberty street, for the best hard rubber goods. Large silver medal.

N. Y. Belting and Packing Co., 37 Park Row, for the best India rubber machine belting. Silver medal.

Bramhill & Campbell, 190 William street, for the second best India rubber machine belting. Diploma.

Gutta Percha Manufacturing Co., 165 Broadway, for specimens of gutta percha goods. Bronze medal.

JEWELRY.

Discretionary.

C. H. Phelps, 198 Sixth avenue, for specimens of hair jewelry. Diploma.

American Jet Jewelry Co., 133 Mercer street, for specimens of imitation jet jewelry. Diploma.

LAMPS AND CHANDELIERS.

Judges—Sam'l B. H. Vance; C. H. Fellows, M. A. Dietz.

Tiffany & Co., 550 Broadway, for the best chandelier. Bronze medal.

W. B. Billings, 396 Broadway, N. Y., for the Union light and safety gas lamp. Silver medal.

F. G. Green, 455 Broome street, N. Y., for patent reflectors. Diploma.

Adolph Rœsler, 335 Broadway, N. Y., for a self-lighting lantern. Diploma.

Ferdinand Wuetesich, 217 Bowery, N. Y., for a safety burner for fluid lamps. Diploma.

Alexander J. Walker, 298 Broadway, N. Y., for safety fluid lamps. Diploma.

City Manufacturing Co., Waterbury, Conn. (C. P. Lindley, agent, 36 Beekman street), for coal and carbon oil lamps. Diploma.

H. L. Thomas, 614 Broadway, N. Y., for a self-lighting lamp. Diploma.

LEATHER MACHINE BELTING.

Discretionary.

Hoyt Bros., 28 Spruce street, for the best leather machine belting (strap jointed). Silver medal.

E. W. Thompson & Co., 378 Pearl street, for excellent leather machine belting. Diploma.

LOCKS, SAFES, ETC.

Judges—Wm. E. Caldwell, Josiah Pierce, Walter Clark, C. F. Alvord.

Martin Briggs, Rochester, N. Y., for the best locks for safes and vaults. Silver medal.

New Britain Bank Lock Co., New Britain, Conn., for a superior lock for safes and vaults. Bronze medal.

R. M. Patrick, 63 Murray street, for the workmanship on a parlor safe. Silver medal.

John B. Murray & Co., 40 Wall street, for a patent United States mail box. Bronze medal.

W. Howard Mitchell, 27 Bleecker street, for a self-acting window lock and holder. Diploma.

J. H. McWilliams, 80 Beekman street, for window fasteners. Diploma.

J. P. Kenyon, 361 Grand street, Brooklyn, for an invisible door spring. Diploma.

Isaac Rogers, 115 Bleecker street, for a blind apparatus. Diploma.

Henry Burt, Newark, N. J., for insurance door bolts and door checks. Diploma.

MACHINERY, NO. I.

Railroad Machinery and Fixtures.

Judges—J. C. Cary, O. P. Smith.

C. A. Smith, Piermont, N. Y., for the best reclining car seat. Silver medal.

W. S. Childs, Piermont, N. Y., for the second best reclining car seat. Bronze medal.

Adam Hay, Newark, N. J., for railroad chairs. Diploma.

Levi Bissell, 147 Wooster street, for an improved locomotive truck. Large silver medal.

New England Car Spring Co., 61 Chambers street, for India rubber car springs. Bronze medal.

J. R. Hilliard, Paterson, N. J., for a railroad switch and lock joint. Diploma.

Wm. S. Pratt, 128 Fulton street, for an anti-friction journal. Silver medal.

John W. Lockwood, 35 Carmine street, for a pocket head rest. Diploma.

Allen Lapham, (C. A. Durgin, agent, 335 Broadway,) for an automatic car coupling. Diploma.

MACHINERY, NO. II.

Lathes, Presses, Boiler Makers' Tools, &c.

Judges—Warren Rowell, Henry Steele.

James M. Bottum, 169 Broadway, for universal lathe chucks of elegant workmanship. (A gold medal having been before awarded.) Diploma.

Leonard & Clark, Moodna, Orange county, N. Y., for the best engine lathes, good workmanship and finish. (A gold medal having been before awarded.) Diploma.

Thos. Prosser & Son, 28 Platt street, for boiler makers' tube tools, of perfect workmanship and universal utility. Silver medal.

Dod & Reed, 55 and 57 First street, Williamsburgh, for a patent soldering iron. Diploma.

Parker, Snow, Brooks & Co., West Meriden, Conn., for the best punching presses. (A silver medal having been before awarded.) Diploma

John Galligher, 7 King street, for a model of a bar iron cutter. Diploma.

MACHINERY, NO. III.

Machines for working wood.

Judges—John S. Brownne, David R. Quick, Joseph W. Little.

J. M. Greenwood, Rochester, N. Y., (D. R. Bowker, agent, 5 West 24th street,) for the best head turning machine. Silver medal.

S. M. Hamilton, Baltimore, Md., (Tice, Grosvenor & Butler, agents, 28th street and Broadway,) for the best variety molding machine. Large gold medal.

Kaefer Power Co., Harlem Railroad Building, for the best mortising, boring, circular and scroll sawing machine. Large silver medal.

B. E. Parkhurst, 114 Third avenue, for a portable timber, board, siding and lath sawing machine. Large silver medal.

D. A. Green, 227 Sixth avenue, for a model of a wood splitting machine. Diploma.

H. D. Stover, 13 Platt street, for a shaping machine. Large silver medal.

Wm. M. Cassidy, Albany, N. Y., for Huntoon's machine for carving wood. Silver medal.

Seely & Chism, 34½ Pine street, for a shingle machine. Silver medal.

A. D. Waymoth, Fitchburg, Mass., for a universal wood turning machine. (Silver medal having been before awarded.) Diploma.

Gray & Woods, Boston, Mass., for a machine for planing straight and out of wind. Silver medal.

Huntington Machine Co., Newark, N. J., for a spoke lathe. Diploma.

MACHINERY, NO. IV.

Steam Pumps, Gauges, Lubricators, Oil Cups, Boiler Tubes, etc.

Judges—Clinton Roosevelt, Benjamin Garvey.

William D. Andrews, 414 Water street, for a centrifugal pump for wrecking. Gold medal.

Cary & Brainerd, 240 Broadway, for rotary force pumps. (A gold medal having been before awarded.) Diploma.

James M. Edney, 147 Chambers street, for a force pump. Diploma.

Thomas Prosser & Son, 28 Platt street, for steel boiler tubes. Diploma.

John Sutton, 114 Cannon street, N. Y., for a floating heater and evaporator. Bronze medal.

John Sutton, 114 Cannon street, N. Y., for automatic lubricator. Bronze medal.

John Sutton, 114 Cannon street, N. Y., for a self-feeding oil cup. Diploma.

Wm. Gee & Co., 6 and 7 Harlem Railroad Buildings, for steam and water gauges and lubricators, oil cups, and gauge cocks. Diploma.

Chas. T. Porter, 235 West 13th street, for governors for regulating speed of steam engines. Silver medal.

Wm. Webster, Morrisania, N. Y., for a steam draft and damp regulator. Diploma.

A. K. Tupper, Milford, Michigan, for a patent adjustable union joint for water, steam, gas, etc. Silver medal.

Sawyer & Carr, No. 8 Bedford street, for a cut-off for kitchen boilers. (A silver medal having been before awarded.) Diploma.

U. B. Vidall, 184 Duane street, N. Y., for a steam blower. Diploma.

MACHINERY, NO. V.

Hydraulics.

Judges—Theo. F. Engelbrecht, Benjamin Garvey.

Henry Getty, 20 Prospect street, Brooklyn, L. I., for the best self-closing faucets and lever faucet. Silver medal.

Henry Getty, 97 Cliff street, N. Y., for a self-ventilating lager beer faucet. Diploma.

Armstrong & Blacklin, 278 Court street, Brooklyn, for the best specimen of plumbing. Bronze medal.

Sidney Smith, 164 Myrtle avenue, Brooklyn, for a shower-bath and specimen of plumbing. Diploma.

Metre and Hydrant Co., 57 First street, Williamsburgh, L. I., for Washington hydrants. Bronze medal.

Race & Mathews, Seneca Falls, N. Y., for yard hydrants, fire hydrants, and street washers. Bronze medal.

McKenzie & O'Hara, 826 Fourth street, N. Y., for the diaphragm filter. (A silver medal having before been awarded.) Diploma.

Thomas Prosser & Son, 28 Platt street, N. Y., for glass enamelled pipes for water. Diploma.

Sawyer & Carr, 8 Bedford street, for a water closet. (A silver medal having been before awarded.) Diploma.

McKenzie & O'Hara, 826 Fourth street, N. Y., for McKenzie's sink with cocks. Diploma.

Dudgeon & Lyon, 466 Grand street, N. Y., for hydraulic jacks. (A silver medal having been before awarded.) Diploma.

Thomas Prosser & Son, 28 Platt street, N. Y., for samples of tubes for artesian wells. Diploma.

J. F. Durkee, Machias, Me. (S. A. Heath & Co., agents, 37 Park Row), for a model of a ship's pump. Diploma.

J. M. Lunquest, Griffin, Ga. (S. A. Heath & Co., agents, 37 Park Row), for a four cylinder pump. Diploma.

Daniel Du Pre, Raleigh, N. C. (S. A. Heath & Co., agents, 37 Park Row), for a water elevator. Diploma.

Lawton & Bliss, Newport, R. I. (J. W. Downing, agent, 16 Broadway, N. Y.), for patent hose connections. Diploma.

MACHINERY, NO. VI.

Printing Presses.

Judges—John J. Hallenbeck, John F. Baldwin.

A. & B. Newbury, Windham, N. Y., for job printing presses. Diploma.

Edward Burroughs, Rochester, N. Y. (S. A. Heath & Co., agents, 37 Park Row), for the best paper cutting machine. Silver medal.

MACHINERY, NO. VII.

Flouring, Mills, etc.

Judges—Geo. Wade, Jacob Allen.

Charles Ross & Co., 212 East 25th street, N. Y., for the best flouring mill. Gold medal.

G. Sanford, Poughkeepsie, N. Y. (J. A. Bennet, agent, 45 Gold street), for a farm flouring mill. Large silver medal.

Thomas F. Waganer, Trenton, N. J. (S. A. Heath & Co., agents, 37 Park Row), for a grain huller. Bronze medal.

Sanford & Price, Newark, N. J., for the best grain separator and smut machine (Tobin's patent). Large silver medal.

Harris Brothers, Elizabeth, N. J., for a smut and scouring machine. Diploma.

MACHINERY, NO. VIII.

Sewing Machines

Judges—Levi Reuben, John A. Schenck, James M. Bottum.

CLASS 1.—*Shuttle or Lock-stitch Machines, for family and light manufacturing purposes.*

Wheeler & Wilson Manufacturing Co., 505 Broadway, for the best sewing machine. (A gold medal having been before awarded.) Diploma.

M. Finkle & Lyon, 503 Broadway, for the second best sewing machine. Large silver medal.

Ladd, Webster & Co., 500 Broadway, for the third best sewing machine. Silver medal.

CLASS 2.—*Shuttle or Lock-stitch Machines, for heavy and general manufacturing purposes.*

First & Frost, 171 Suffolk street, for the best sewing machine. Large silver medal.

M. Finkle & Lyon, 503 Broadway, for the second best sewing machine. Silver medal.

Ladd, Webster & Co., 500 Broadway, for the third best sewing machine. Bronze medal.

CLASS 3.—*Double Chain Stitch Machines, for family and light and heavy work.*

Grover & Baker Sewing Machine Co., 501 Broadway, for the best sewing machine. Large silver medal.

Merrill & LaCroix, 413 Broadway, for the second best sewing machine. Silver medal.

L. A. Bigelow, 421 Broadway, for the third best sewing machine. Bronze medal.

George C. Munson, 421 Broadway, for a tucking gauge. Diploma.

MACHINERY, NO. IX.

Miscellaneous Inventions.

Judges—B. Garvey, H. L. Stuart, Thos. P. How.

Norman Wiard, Janesville, Wisconsin, for a model of a steam ice boat. Silver medal.

H. C. Lee (agent), 514 Broadway, for a knitting machine, adapted to various kinds of work. (Goffe's patent.) Large silver medal.

J. B. Aiken, Manchester, N. H., for a very excellent knitting machine for plain work. Large silver medal.

Miller & Benton, 11 Platt street, N. Y., for a belt clasp. Diploma.

E. Burroughs, Rochester, N. Y. (S. A. Heath & Co., agents, 37 Park Row), for a carrying jack. Diploma.

Wm. F. McGinley & Co., 48 Beekman street, for a belt clasp. Diploma.

Phillips & Williams, Newark, N. J., for a pipe wrench. Diploma.

A. Bridges & Co., 64 Cortlandt street, for hoisting jacks. Diploma.

E. C. Williams, 64 Cortlandt street, for a baling press. Diploma.

Fitzhugh Smith, 769 Greenwich street, for a saw gummer. Diploma.

Gray & Woods, Boston, Mass., for a self-oiling box for shafting. Diploma.

George Jackson, Little Falls, N. Y., for wool and hair felting. Diploma.

Arthur Ingram, 334 Fourth avenue, for a grab for cleaning water closets. Diploma.

M. M. White & Co., Globe Iron Works, Thirty-third street, N. Y., for a model of an iron bridge. Diploma.

Thos. Bell, 125th street and 4th avenue, for a patent spring brace. Dip.

Snider & Gorton, Eighty-sixth street, Yorkville, N. Y., for an improved head for tinsmiths. Diploma.

Wm. Allender, New London, Ct., for a clothes wringing machine. Dip.

W. H. Benson, Wetumka, Ala. (S. A. Heath & Co., agents, 37 Park Row), for a wind and water wheel. Diploma.

N. Y. & Southern Bale Rope Co., 70 Wall street, for a cordage machine. Diploma.

S. B. Peet, 10 Lamartine Place, for a model volute spring, combined with elliptic spring. Diploma.

B. J. Burnett, Mount Vernon, N. Y., for a model of an independent crane. Silver medal.

Alanson Brown, Rochester, N. Y., for a ticket belt fastener. Diploma.

Ransom Crosby, Newark, N. J., for a mitre machine. Bronze medal.

William Cowin, Lambertsville, N. J., for Johnson's patent hangers for shafting. Diploma.

Francis Allen, Boston, Mass., for a brick machine. Diploma.

S. A. Heath & Co., 37 Park Row, for a coal dumping bucket. Diploma.

John Alexander & James Ritchie, Williamsburgh Iron Foundry, Williamsburgh, L. I., for an improvement in making patterns. Silver medal.

C. P. Marshall, Fitchburg, Mass., for a simple and cheap blower. Dip.

MACHINERY, NO. X.

Gas and Soda Water apparatus, etc.

Judges—P. H. Van Der Weyde, B. S. Hedrick.

John Matthews, 487 First avenue, for the best soda water apparatus, very elegant workmanship. (A silver medal having been before awarded.) Dip.

W. H. Griffith, 418 Broadway, for the best gas regulator, "Waterman's." Bronze medal.

John H. Cooper, Philadelphia, Pa., for the second best gas regulator. Diploma.

Henry B. Herts, Mark Levy & James Alexander, 28 Liberty street, for Werner's patent apparatus for generating gas from wood. Large silver medal.

J. D. Moore, 80 West 19th street, for an apparatus for generating gas from resin, fat, etc. Silver medal.

Code, Hopper & Gratz, Philadelphia, Pa. (Wm. L. Shoener & Co., agents, 135 William street), for a rotary valve dry metre. Bronze medal.

J. H. Gautier & Co., Jersey City, N. J., for the best clay gas retort. Large silver medal.

J. K. Brick & Co., Brooklyn, L. I., for very fine specimens of clay gas retorts. (A silver medal having been before awarded.) Diploma.

F. C. Krause, 772 Eighth avenue, for a porous gas burner. Diploma.

Minor.

Daniel Smith, corner 26th street and First avenue, for a model of a soda water apparatus. Webster's Dictionary.

MACHINERY, NOS. XI AND XII.

Woolen and Cotton Machinery.

Judges—Alexander Knox, Wm. Montgomery, C. Balmforth.

Stedman, Fuller & Co., Lawrence, Mass., for superior specimens of card clothing. Diploma.

C. L. Goddard, 3 Bowling Green, for an excellent burring machine for wool-carding engines. (A gold medal having been before awarded.) Diploma.

Lawrence Holms, Paterson, N. J., for a combination cotton spindle. Diploma.

Andrew Scott, 271 West 42d street, for an apparatus for soldering the tops on fliers for cotton machinery. Diploma.

MACHINERY, NO XIII.

Steam Engines.

Judges—C. H. Delamater, Joseph Nason, John B. Jervis.

J. C. Hoadley, Lawrence, Mass., for the best portable steam engine. Large gold medal.

Fishkill Landing Machine Co., Fishkill, N. Y., for the second best portable steam engine. Large silver medal.

Payne & Olcott, Corning, N. Y., for the third best portable steam engine. Silver medal.

Geo. H. Reynolds, Novelty Iron Works, N. Y., for the best stationary steam engine. (A gold medal having been before awarded.) Diploma.

Todd & Rafferty, Paterson, N. J., for improvements on high pressure steam engines. Gold medal.

C. A. Schultz, 257 Seventh street, for improvements on the steam engine. Large silver medal.

Discretionary.

C. H. Raymond, Jersey City, N. J., for model of a beam engine. Diploma.

STEAM FIRE ENGINES.

Judges—Samuel H. Maynard, Wm. B. Leonard, James Renwick.

Manhattan Fire Engine Co. No. 8, 91 Ludlow street, for the steam fire engine "Manhattan." Gold medal.

STEAM PLOW.

Joseph W. Fawkes, Christiana, Pa., for a steam plow. Cash, $1,000.

PROSSER'S STEAM BOILER AND CONDENSER.

Judges—Geo. H. Reynolds, L. W. Turrell.

Thomas Prosser & Son, 28 Platt street, for a steam boiler and condenser. Silver medal.

MATHEMATICAL AND PHILOSOPHICAL INSTRUMENTS.

Judges—Alexander J. Cotheal, Benjamin Garvey, Levi Reuben.

Henry W. Trimble, Newark, N. J., for the best platform hay scales. Large silver medal.

John Howe, Jr., Brandon, Vt., for an extremely well finished and accurate hay scale. Silver medal.

John Howe, Jr., Brandon, Vt., for a very accurate assortment of scales. Bronze medal.

Henry Troemner, Philadelphia, Pa. (Frank E. Howe, agent, 191 Broadway), for gold and silver, druggists, and grocers' scales. Bronze medal.

John P. Gruber, 184 Chatham street, for a well finished large bank scales. Diploma.

A. Wilson, 4 Wall street, for the best electric gas lighting machine. Gold medal.

S. Gardiner, Jr., 167 Broadway, for the second best electric gas lighting apparatus. Silver medal.

Ryerson & Huested, 218 West 35th street, for a submarine explorer. Gold medal.

J. M. Grumman, 377 Fulton street, Brooklyn, L. I., for patent surveying chains. Bronze medal.

Jabez Burns, 245 West 29th street, for an addometer. Bronze medal.

Joseph Grice, 96 Wall street, for a marine salinometer. Bronze medal.

Samuel W. Francis, 1 Bond street, for a writing printing machine. Diploma.

H. Homan & Co., Cincinnati, Ohio, for gyroscope tops. Diploma.

Victor Beaumont, 175 Centre street, for metallic barometers. Diploma.

G. Tagliabue, 298 Pearl street, for a patent parlor barometer. Diploma.

S. B. Smith, 322 Canal street, for magnetic machines. Diploma.

A. H. Ogden, 64 West 29th street, for a glass steam engine, for illustrating lectures. Diploma.

C. V. Mapes, corner Nassau and Beekman streets, for a fire annihilator, a very convenient hand force pump. Diploma.

MECHANICAL AND ARCHITECTURAL DRAWING AND DESIGNS.

Chas. Duggin, 532 Broadway, for architectural designs. Bronze medal.

Discretionary.

Albert Aston, 177 East Broadway, for a specimen of mechanical drawing. Diploma.

METALS.

Judges—Wm. D. Andrews, L. W. Turrell, Thomas F. Waganer.

Fuller, Lord & Co., 139 Greenwich street, for the best specimen of hot pressed and punched nuts. Silver medal.

Damascus steel and Iron Co., 71 John street, for the best specimens of cast steel. Large silver medal.

D. B. & G. H. Bruen, Newark, N. J., for superior specimens of malleable iron. Bronze medal.

Jones & Lauth, Pittsburg, Pa., for the best specimens of rolled shafting. Large silver medal.

Densmore Iron Co., Mott Haven, N. Y., for specimens of iron made in Harvey's furnace. Diploma.

Discretionary.

New York Seamless Tube Co., Port Morris, N. Y., for rolled seamless copper tubes. Large silver medal.

MILLINERY.

Judges—Jennet Davidson, Josephine A. Slote, Louisa De Voe.

Mrs. Wm. Simmons, 637 Broadway, for the best millinery. (A silver medal having been before awarded.) Diploma.

Mrs. G. Schlegel, 575 Broadway, for the second best millinery. Bronze medal.

Isaac Binns, 309 Hudson street, for mourning bonnets. Diploma.

MINERALS.

Judges—Lewis Feuchtwanger, Isaiah Deck.

Samuel Wetherill, Bethlehem, Pa., for superior specimens of American spelter, made by his process, direct from the ore. Diploma.

Union Quarrying and Mining Co., 8 Wall street, for a specimen of verde antique marble. Diploma.

MUSICAL INSTRUMENTS.

Discretionary.

W. H. Senior, 544 Broome street, for a banjo, a beautiful specimen of work. Diploma.

NAVAL ARCHITECTURE, BOATS, ETC.

Judges—Geo. F. Barnard, A. J. Dupignac, E. Hill.

Martin Hubbe, 131 Fulton street, for the models of vessels. Bronze medal.

Chas. Auziere, 96 Gold street, for a model of Yacht Zinga. Diploma.

Chas. Auziere, 96 Gold street, for a glass model of a barque. Diploma.

Chas. Douglass, Hebron, Conn., for a ship's ventilator. Diploma.

O. R. Ingersoll, 248 South street, for a working boat. Bronze medal.

Mathias Ludlum, 371 South street, for a life boat. (An improvement on that for which a gold medal has been before awarded.) Diploma.

H. Mitchell, 69 West street, for the best samples of oars. Diploma.

NEEDLE-WORK, EMBROIDERY, ETC.

Judges—Mrs. M. L. Timpson, Mrs. L. De Voe, Mrs. J. E. Lewis.

Mrs. M. M. Pullen, for the best lace and crochet work. Silver medal.

Mrs. Ellen Camp, Flushing, L. I., for the best imitation Marseilles quilting. Diploma.

Mrs. S. B. Pratt, 54 Market street, for the best rural picture frames. Diploma.

Mrs. A. W. Stone, Atlanta, Ga., for the best worsted piano cover. Silver medal.

Eliza J. Robinson, 60 Perry street, for the second best worsted work, "Rebecca at the well." Diploma.

Mrs. R. Van Houten, 75 Nassau street, for the best shirts. (A silver medal having been before awarded.) Diploma.

Miss Lizzie Earle, Fifth avenue, corner of 37th street, for the best feather flower bouquet. Diploma.

Mrs. Kate Whitelaw, 71 East 14th street, for the best wax flowers, a large and beautiful collection. Silver medal.

Miss H. M. De Wolf, 96 Fourth avenue, for the best wax fruit. Diploma.

John Fletcher, 419½ Broadway, for beautiful hair coral sets. Bronze medal.

Mme. Demorest, 375 Broadway, for the best skirts. Bronze medal.

S. Sherman, 264 Fulton street, Brooklyn, for skeleton skirts. Diploma.

Miss F. Salomon, Morrisania, N. Y., for a worked skirt. Diploma.

Madame Demorest, 375 Broadway, for the best patterns of ladies' and children's apparel. Diploma.

Mrs. Rebecca Githens, Philadelphia, Pa., for a system of cutting boys' clothing. Diploma.

Madame Demorest, 375 Broadway, for the best system of dress-cutting. (A silver medal having been before awarded.) Diploma.

Mrs. A. Phelps, 255 Sixth avenue, for the best silk quilt. Diploma.

Estelle Clark, San Francisco, Cal. (eight years old), for a quilt. Diploma.

Elizabeth Luke, Yorkville, N. Y., for superior knitted quilts. Diploma.

Patients of the N. Y. Lunatic Asylum, "Mary Goodwin, Matron," for specimens of embroidery and a silk quilt. Diploma.

ORGAN HARMONIUMS AND TRIOLODEONS.

Judges—H. W. Wollenhaupt, Chas. Eichhorn, Anthony T. Davis.

Mason & Hamlin, Boston, Mass. (Chickering & Sons, agents, 694 Broadway, N. Y.), for an organ harmonium of fine sound. Silver medal.

Van Oeckelen & Dücker, 618 Broadway, for the triolodeon, an ingenious invention. Large silver medal.

PAINTS.

Hoagland & Wallace, New Brunswick, N. J., for superior mineral paint. Diploma.

E. E. & J. F. Ellery, 596 Grand street, for India rubber paint. Diploma.

PENMANSHIP.

Judges—Hiram Dixon, G. H. Coggeshall, Lewis H. Embree.

Benj. F. Brady, 195 West 27th street, for the best specimens of ornamental penmanship. Silver medal.

Benj. F. Brady, 195 West 27th street, for the second best specimens of penmanship. Diploma.

John D. Williams, 27 Barrow street, for the best specimens of off-hand flourishing. Bronze medal.

Chas. Wellenaw, 51 Carmine street, for beautiful specimens of ornamental cards. Diploma.

Benj. F. Brady, 195 West 27th street, for a steel pen portrait of Daniel Webster. Diploma.

Lewis F. Vanderwale, 156 West 43d street, for phonographic specimens. Diploma.

PHOTOGRAPHY, ETC.

Judges—Henry Draper, C. M. Hall, P. H. Van Der Weyde.

J. Gurney, 707 Broadway, for the best photographs in oil. (A gold medal having been before awarded.) Diploma.

C. D. Fredricks, 585 Broadway, for the second best photographs in oil. Silver medal.

J. Gurney, 707 Broadway, for the best ivorytypes. Large silver medal.

C. D. Fredricks, 585 Broadway, for the best India ink vignettes. Large silver medal.

J. Gurney, 707 Broadway, N. Y., for the second best photographs retouched in India ink. Diploma.

Waters & Tilton, 90 Fulton street, N. Y., for superior photographs on wood. Silver medal.

A. Becker, 411 Broadway, N. Y., for a revolving stereoscope. Bronze medal.

J. Gurney, 707 Broadway, for photographs in water colors and pastel. (A silver medal having been before awarded.) Diploma.

PIANO-FORTES.

Judges—Chas. Eichhorn, Anthony T. Davis.

Barberie & Bloomfield, 173 Grand street, N. Y., for the best piano-forte. Large silver medal.

Lighte & Bradbury, 421 Broome street, for the second best piano-forte. Silver medal.

James Van Riper, 178 Wooster street, N. Y., for a piano-forte. Diploma.

PREPARATIONS OF NATURAL HISTORY.

Judges—T. F. King, J. L. Bode.

John G. Bell, 839 Broadway, N. Y., for the best specimens of prepared birds. Bronze medal.

RANGES, COOKING AND PARLOR STOVES.

Judges—Wm. D. Andrews, Theo. F. Engelbrecht, H. L Stuart.

Bramhall, Hedge & Co., 442 Broadway, N. Y., for the best cooking range. Silver medal.

F. S. Merrett, 115 Bleecker street, for the second best cooking range. Bronze medal.

James Ingram, 334 Fourth avenue, for the third best cooking range. Diploma.

E. Backus, 233 Water street, for the best cooking stove. Silver medal.

Sanford, Truslow & Co., 239 Water street, for the second best cooking stove. Diploma.

Bartlett & Lesley, 426 Broadway, for the best hot air furnace. Silver medal.

John Liddle, 235 Water street, for the second best hot air furnace. Bronze medal.

Erastus Corning & Co., Albany, N. Y. (J. V. Tibbetts & Co., agents, 285 Canal street), for the best parlor stoves (Littlefield's patent). Silver medal.

M. J. Frisbie, 248 Pearl street, N. Y., for the second best parlor stoves. Bronze medal.

Jacob J. Folts, Buffalo, N. Y., for the third best parlor stoves. Diploma.

S. T. McDougall, 418 Broadway, for the best gas stove. Silver medal.

M. W. Kidder, Lowell, Mass., for the second best gas stove. Bronze medal.

H. J. Davidson, for a baker's spiral oven. Silver medal.

John H. Griscom, 42 East 29th street, for the best system of ventilation. Large silver medal.

James Ingram, 334 Fourth avenue, for a range water back. Silver medal.

J. V. Tibbetts, 285 Canal street, for a fire-proof register. Diploma.

Henry C. Spalding, 30 Platt street, for a beef steak improver. Diploma.

Discretionary.

Rudolph Knecht, 83 Greenwich street, for an air purifier. Silver medal.

REFRIGERATORS.

Judges—Benjamin Garvey, Chas. A. Seely, Thos. F. De Voe.

Bartlett & Lesley, 426 Broadway, for the best refrigerators. Silver medal.

F. L. Hedenberg & Sons, 58 Walker street, for the second best refrigerators. Bronze medal.

C. M. McEnvoy, Richmond, Va., for a table refrigerator. Diploma.

SHAWLS.

Judges—P. F. Randolph, F. T. Wilkins.

Waterloo Manufacturing Co. (Almy, Paterson & Co., agents, 24 Park Place), for superior specimens of shawls. Silver medal.

Chalmers & Kirkland, 33 Vestry street, N. Y., for net silk shawls. Diploma.

SIGN PAINTING.

Judges—Wm. Ebbitt, John Johnson.

John McCarthy, corner Ann and Nassau streets, for a specimen of gilt lettering on glass. Diploma.

John McCarthy, 31 Ann street, N. Y., for a specimen of sign painting. Bronze medal.

S. T. Bailey, 5 Chatham Square, for emblematic signs. Diploma.

Minors' work.

T. T. Fetherston, 56 Sullivan street, for a specimen of sign painting. Webster's Dictionary.

SILVER PLATING.

Judges—Ralph L. Anderton, Wm. Miller, Benj. Newkirk.

Geo. W. Jackson, Brooklyn, L. I., for the best hand plating. Diploma.

Electro-Plating.—Discretionary.

Hiram Young, 20 John street, for the best electro-plated goods. Silver medal.

Chas. Müller, 437 First avenue, for fine specimens of electro-metallurgy. Silver medal.

STRAW HATS.

Discretionary.

J. Fearn, Richmond, S. I., for a specimen of bleaching straw goods. Diploma.

SURGICAL INSTRUMENTS.

Judges—D. M. Reese, A. K. Gardner, L. A. Sayre.

Palmer & Co., 378 Broadway, for the best artificial leg. (A gold medal having been before awarded.) Diploma.

A. A. Marks, 307 Broadway, for the second best artificial leg. Large silver medal.

Marsh & Co., 2 Vesey street, for the best trusses and surgical appliances. (A silver medal having been before awarded.) Diploma.

J. W. Riggs, Broome street, N. Y., for trusses. Diploma.

Delano Life Preserving Coat and Vest Co., 256 Broadway, for life preserving garments. Silver medal.

TRUNKS.

Judges—John Stevens, John Johnson.

Lazare Cantel, 79 West Broadway, for the best water-proof and air-tight trunks. Diploma.

Mathias Ludlum, 371 Fourth street, for an excellent water-proof and damp-proof trunk. Diploma.

UPHOLSTERY.

Judges—Isaac M. Phyfe, J. C. Baldwin.

B. S. Yates & Co., 639 Broadway, for the best upholstery and furniture trimmings. Silver medal.

WATER-PROOF COMPOSITION.

Judges—L. Hallock, J. S. Schultz, F. C. Treadwell.

Abraham Brower, 4 Reade street, for superior water-proof composition for leather. Silver medal.

WOOLEN GOODS.

Judges—P. F. Randolph, F. T. Wilkins.

Winnepauk Manufacturing Co. (Walton & Archer, agents, 46 and 48 Barclay street), for superior tricot, petersham, and talma cloths. Silver medal.

Norfolk Hosiery Co., Norfolk, Conn. (Tillinghast, Shepard & Howe, agents, 5 Park Place), for the best shirts and drawers. Bronze medal.

Troy Hosiery Co., Troy, N. Y. (Chas. Carville, agent, 186 Fulton street), for the second best shirts and drawers. Diploma.

WORK DONE ON SEWING MACHINES.

Judges—Mrs. R. Van Houten, Mrs. A. C. Johnson, Mrs. M. Gardiner.

Wheeler & Wilson Manufacturing Co., No. 505 Broadway.

Finkle & Lyon, No. 503 Broadway.

Grover & Baker Sewing Machine Co., No. 501 Broadway.

First & Frost, No. 171 Suffolk street.

For superior specimens of work done on sewing machines. Diploma to each.

Discretionary.

Mrs. E. Simpson, 495 Broadway, for excellent specimens of machine work on ladies' and children's clothing. Diploma.

Mrs. Bush, for an excellent specimen of work on a child's dress. Diploma.

RECAPITULATION OF PREMIUMS AWARDED.

THIRTY-FIRST ANNUAL FAIR.	Gold medals.	Certified gold medals.	Silver cups.	Silver medal.	Certified silver medals.	Bronze medals.	Diplomas.	Volumes of books.	Cash.	Value.
AT HAMILTON PARK.										
Agricultural Fair	1	....	85	84	....	10	12	13	....	$1,378 07
Steam Plow	....	....	....	....	....	....	....	....	$1,000 00	1,000 00
AT PALACE GARDEN.										
Agricultural and Horticultural department	1	....	23	83	....	....	14	76	....	805 04
Manufacturing and Mechanical department	9	12	....	101	15	65	217	2	....	862 09
Total	11	12	108	218	15	75	243	91	$1,000 00	$4,045 20

ILLUSTRATIONS AND DESCRIPTIONS OF MACHINERY, &c., ON EXHIBITION AT THE 31st ANNUAL FAIR OF THE AMERICAN INSTITUTE, 1859.

Fawkes' American Steam Plow.—(J. W. Fawkes, Christiana, Penn.)

The American Institute, with a liberality which has always characterized the action of its Board of Managers, in all matters pertaining to improvements in agricultural implements, offered a premium of ONE THOUSAND DOLLARS for the best steam plow which should be produced at their Agricultural Fair, in New York, in the month of September, 1859. None other but that of Mr. Fawkes' was entered for competition, and the Institute, without hesitation, awarded to him the liberal premium above mentioned, which, together with expenses, were promptly paid him at the close of the fair.

This machine has been tested in practical operation, before eight different committees of practical agriculturists, machinists, and scientific men, viz.:

1. A committee of the Pennsylvania State Agricultural Society, *favorable report.*

2. The Philadelphia Society for the Promotion of Agriculture, *grand gold medal and report.*

3. Franklin Institute, of Philadelphia, *Scott legacy premium of* $20 *and medal.*

4. Illinois State Agricultural Society, $500 *premium in* 1858, and $1,500 *premium in* 1859.

5. United States Agricultural Society, at their Seventh Annual Exhibition at Chicago, *grand gold medal of honor.*

6. Illinois Central Railroad Company, $1,500 *premium and report corroborating the above awards.*

7. American Institute, at New York, *premium of* $1,000.

8. A committee of scientific and practical machinists, appointed by the Illinois State Agricultural Society, and of the Illinois Central Railroad Company.

John W. Fawkes' history is a complete commentary upon the possibilities of genius and industry. The son of a farmer in Lancaster county, Pa., he received the limited education usually given to boys in the country. He was apprenticed to learn the carpenter's trade, but in a few years took a small machine-shop, and built seed-drills and lime-spreaders, acting himself as manager and general foreman, without having other qualifications for the post than a natural aptitude for mechanics. Traveling frequently, in 1851, through the prairie country of the west, he saw the necessity for an application of steam-power to the tillage of the vast fields; and one idea giving birth to others in rapid sequence, he gradually matured a plan, and in the fall of 1855, reduced it to shape by making a model of his engine. His only tool was a primitive sort of lathe, the mandril of which he made from an old screw-bolt. The model completed, he took it to Washington and entered a caveat. He then went to Christiana, Pa., where he found friends to advance the means to complete his patent. His first idea of a steam-traveling engine was, that it should have the power applied to a large drum, bulged in the middle like a barrel; and he has never changed it, except in minor details.

Description of the New Plow.

The engine is a high pressure one, with an upright tubular boiler containing 228 1¼ inch tubes, a 9-inch cylinder, and 15-inch stroke. It works direct a crank shaft, which revolves inside the sleeve of a drum-wheel, through spur gearing. The drum has three iron spiders, and a heavy wooden face, which is preferable to an iron face, as the latter, becoming quickly bright, slips on sod ground, and thus not only traction power is lost, but the ability to move even is destroyed. The bed-frame of the engine rests on a two-wheeled truck in front, is supported by a body-bolt, and the front wheels and truck are as free to turn as the front axle of a wagon. They are steered by a rack and screw connected, by a toothed chain, to a steering-wheel. To test the ability to turn short corners, Mr. Fawkes, at our request, caused the engine to describe its smallest curve, which, on measuring, we found to be just thirty-four feet diameter, less than twice the length of the engine, eighteen feet. The weight is so distributed that the water-tank behind the drum or great traveling roller, when full, balances the weight of the boiler which is placed in front; hence the weight resting upon the small guide-wheels in front is but little, and they are left quite free to turn. To work the machine requires two men, one to steer and attend to the engine—which he can do, as the cocks, levers, &c., are placed just at his side—the other to fire and attend to any odds and ends of work on the ground or elsewhere.

The plows, of which there are eight employed, are the ordinary Moline plow, fastened to a frame of such shape that the furrows are turned regularly one after the other. Davits extend from the rear of the engine, and on these are grooved pullies for chains, one end of which is hooked to the plow frame, and the other is fastened to a windlass. When the engineer wishes to hoist plows, he whistles once, and the fireman draws a lever on the platform of the engine. This turns a clutch into gear, which gives motion to the windlass to which the hoisting-chains are attached. The chain is so arranged as to draw the points of the plows out of the ground first, and when it has wound to a certain point it throws itself out of gear, and thus the plows, swinging clear of the ground, may be transported anywhere. To lower them he gives two whistles, and the lever is drawn, which lets the plows down to work. Enough slack is given to the chains to suffer the plows to turn furrows of even depth in all inequalities of ground. This is an important point, and Mr. Fawkes should invent some sure method of accomplishing it without compelling the fireman to leave his post to slacken the chains by hand.

The engine consumes twelve bushels of coal per diem and a quarter of a cord of wood for kindling. Mr. Fawkes says his large heating surface enables him to get up steam in fourteen minutes, if he has first-rate dry wood. The engine (30-horse) and plow complete will be sold for $3,500.

Its other uses.

When the harvest is ripe and gathered, and the thrashing machine has been got out and cleaned, the engine is lifted from the floor by jackscrews, blocked up, and then, disconnecting the gear by means of an eccentric, and clutching the driving-wheel, or big rolling drum, to the crank-shaft; so that for every revolution of the crank-shaft there is one of the drum. He is then ready to put the belt of a thrashing machine, corn mill, or other farm implement on the drum, and he gets as many revolutions as he may require. This gives him an advantage over ordinary stationary engines, for he can use the expansion of steam at any degree, and he has the power of reverse motion. By throwing back a reverse lever, he can stop the drum almost instantly. In going down hill he has slid the whole machine in a space of five feet; not, of course, without much jarring of the engine, but still it serves to show what perfect control he has over the engine in case of any accident to the plow, or engine itself; and in working up to headlands or fences, he can move one foot or two, or less or more, forward or backward, as occasion may require.

To pump water into the boiler, he used a donkey-pump, and can use it when either stationary or in motion, and with a length of hose can run alongside a ditch, well, or brook, and fill his tank without trouble.

Whitcomb's Metallic Spring-tooth Horse Hay Rake.

Whitcomb's Metallic Spring-tooth Horse Hay Rake.

Invented by George Whitcomb, of Port Chester, N. Y.

The above rake is designed for hay-raking and gleaning grain fields, after the cradle. By means of several holes in the arms, the rake-head may be elevated a little, so the teeth will pass lightly over, or just above the surface of the ground.

For hay-raking, in every variety of field and all kinds of grass, this machine is offered by its inventor with entire confidence to farmers and dealers. It is operated by a lad 12 or 14 years of age, is simple in its construction, and will rake 20 acres per day. It can be worked with a boy, comfortably seated, with feet upon the treadles.

The rake-head is attached in such a manner as to act as a *partial counterpoise*, and assist in elevating the teeth as the hay is discharged, and also serves to prevent the *casual rising* of the teeth from the ground, at the same time allowing them to conform to the irregularities of the ground; this, with the elasticity of the teeth, enables it to pass over stones and other obstacles. Horse rakes, with metallic spring teeth, *without wheels*, have been long in use, and have answered a useful purpose; but to use them is hard work, and they plow into *light*, *porous* ground, as the weight rests upon the teeth, and collect dirt, dust, and stones. But the Whitcomb rake passes lightly over, and places the hay in winrows, *without compressing*, like the revolver—in good condition for curing and pitching; it works equally well in rough, uneven, as on smooth ground.

The rake head is designedly placed near the axle, otherwise it would not rake clean on *rough* ground. Like other machines, it requires a little practice in using.

[*A silver medal awarded.*

R. S. Stenton's Landside Cutter Plow.

The landside cutter is shown in each of the three engravings, attached to the heel of the plow, and as fig. 2 of each it is shown detached. It consists of a piece of steel of triangular shape, and for ordinary plows it is 12 inches long by from 3½ to 5 inches wide at the heel. It has an upright shoulder by which it can be attached to the heel of the landside of any plow. In attaching it, the point is made to dip so that it shall enter the ground easily. The only force it requires is the landside pressure, which would be entirely lost in producing friction and resistance. Consequently the employment of this cutter utilizes that force, and enables the same team to turn a furrow one-third wider than they could turn without it. Moreover, a plow fitted with the landside cutter, moves more steadily than one not so provided, therefore is more easily guided by the plowman, who is thus enabled to do more work with less labor. The cutter is very easily adjusted to any plow, or removed from it, so that this vast improvement can be applied by any one at a cost of about $2.

Figure 1.

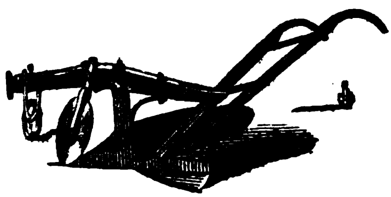


Fig. 1 represents a cast steel prairie plow, made by John Deere, Moline, Illinois, for breaking up raw prairie in any part of the west. It cuts 12 inches wide without, and from 15 to 16 inches wide with the landside cutter.

Figure 2.

Fig. 2 represents a fine German steel plow, made by B. Martin & Co., of Cleveland, Ohio. It is adapted to all kinds of work in that locality. Mr Martin's testimony, as to the utility of the landside cutter, is as follows:

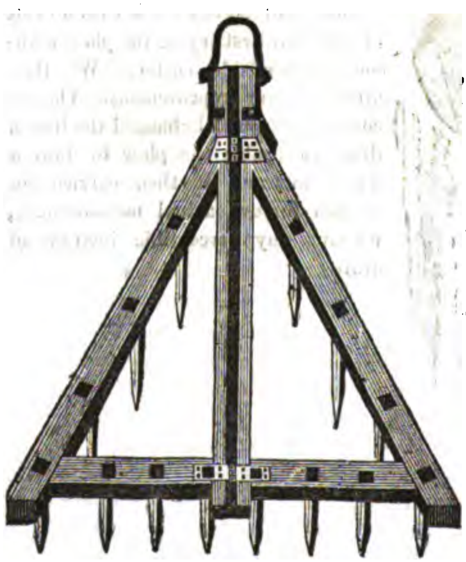
"The capacity of the plow is a furrow slice twelve inches wide, by eight inches deep; perfect work with a draft of 375 lbs., first trying the plow without the landside cutter. We then attached your improvement. The second time around I changed the line of draft to enable the plow to take a wider furrow. It then carried an 18-inch furrow, actual measurement, without any perceptible increase of draft.

Figure 3.

Fig. 3 represents a fine German steel plow, Eagle pattern, made in New York, under Mr. R. S. Stenton's personal supervision. It is intended more especially for the alluvial lands of Long Island and the swampy lands of New York and New Jersey. It is capable of turning a furrow twelve inches wide, by from 6 to 8 inches deep, without the landside cutter; but with this attachment, it cuts 16 inches wide and of equal depth, scouring perfectly in black sticky loam.

A cast iron plow, No. 36, has been made by Horton, Depeu & Co., of Peekskill, with extra care and with an adjustable landside, to which the cutter can be attached, or from which it can be removed at pleasure. It is suitable for all kinds of soil in which a cast iron plow will scour.

[*A bronze medal awarded.*



Hinge Harrow.

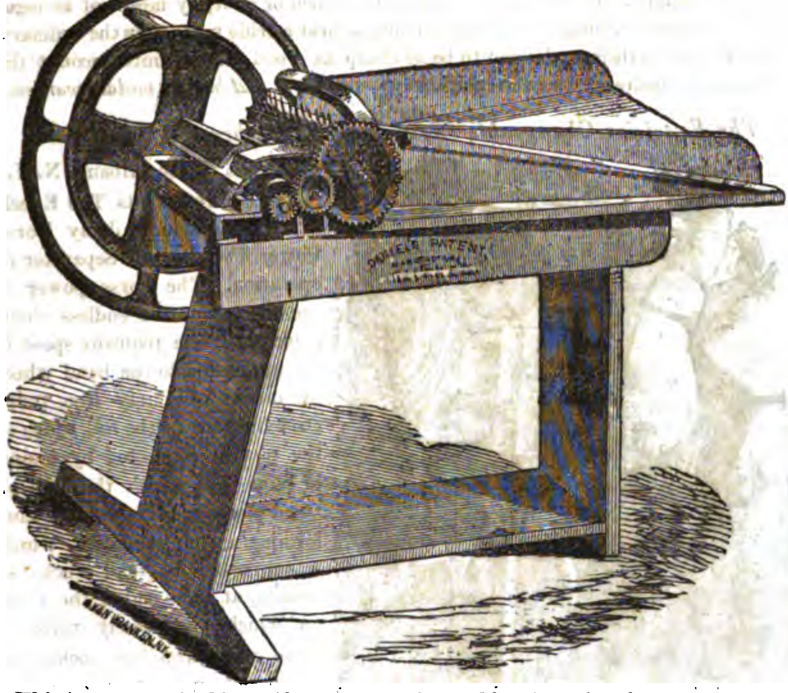
A. F. Mayher & Co., 54 Vesey street.

These harrows are made of various sizes, for one or two horses.

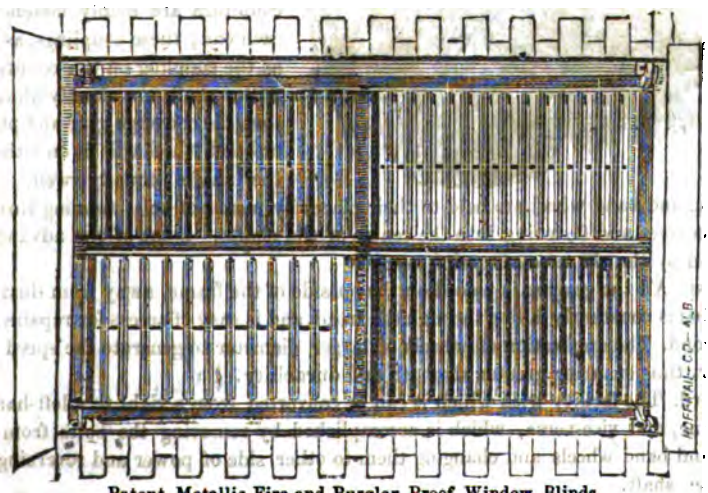
[*A silver medal awarded.*

Daniels' Patent Hay, Straw, and Stalk Cutter.

A. F. Mayher & Co., 54 Vesey street, N. Y.



This is a very valuable stalk cutter, and capable of cutting hay, straw, corn stalks, brushwood for kindling wood, &c. It is very strong, not easily put out of order, and a rapid cutter. [*A diploma awarded.*

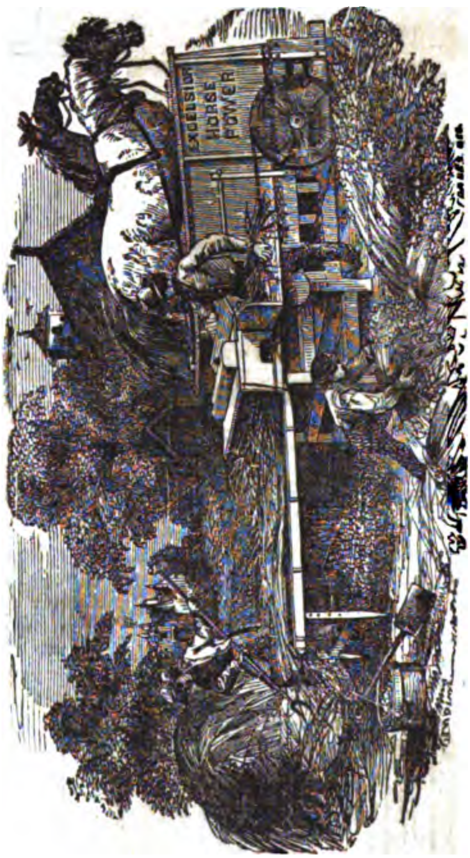


Patent Metallic Fire and Burglar Proof Window Blinds.

H. W. Scott, manufacturer's agent, 35 Cedar street, N. Y.

This article is made upon the same general principle as the Venetian moveable slat wood blinds, although much superior by reason of its great durability—its not being liable to warp, or get out of repair, and the protection it affords against both fire and burglary. It also fastens itself, either open or shut, by means of an ingeniously constructed hinge. Although costing at first a trifle more than the ordinary blind, it is nevertheless claimed to be as cheap as wood, taking into account the difference in insurance and of repairs. [*A bronze medal awarded.*

The Excelsior Changeable Horse Power Thresher and Separator.



Charles E. Pease, Albany, N.Y.

The cut represents The Excelsior Changeable Railway Horse Power Thresher and Separator in operation. The horse power is constructed on the endless chain principle. The requisite speed is communicated to the band wheel by means of thirty iron rods, stretching across the full width of the power, connected by means of links into which the lags or tread pieces are firmly fixed, thus forming a complete chain, which is supported by small trucks or wheels, at each end of the rods, on which they freely revolve; these rods drop into sockets on the periphery of two wheels or reels, which are secured to the main shaft at front end of power; this shaft projects through the frame on both sides, and cast iron couplings are firmly fastened to each end; these couplings, as well as the coupling on the counter or pulley shaft, are exactly alike, so that the converge gear and pulley or band wheel will fit on either of the shafts equally well. The gearing and band wheel are held to their places by means of bolts running through their centres and fastening into the centre of the shafts. Some of the advantages secured by the above construction are:

First. All the gearing is placed on the outside of the frame, away from dust and dirt that is constantly falling through the tread, and is easy of access for repairs, &c.

Second. The application of wheels of larger diameter to generate the speed and power, thus ensuring greater strength and durability.

Third. The facility with which it can be converted from a right to a left-handed machine, and vice-versa, which is accomplished by removing the bolts from the gear and band wheels and changing them to other side of power and reversing the counter shaft.

Fourth. Several different velocities may be given to the band wheel, without increasing or diminishing the speed of the horses, as the couplings are all alike, the band wheel can be used on either shaft. For slow and powerful motion, it is placed on the front or main shaft; and where great speed is required, as in threshing, sawing wood, &c., on the rear or counter shaft.

These machines are constructed for one or two horses.

Price of one horse power, $85; two horse do., $116. The thresher and separator are made changeable, as well as the horse power. The cylinder shaft is of best cast steel, and runs in solid cast iron boxes lined with Babbit metal, making the cylinder run with the least possible friction, and warranting durability. The concave can be easily lowered or raised, to suit the various kinds and conditions of grain, without the use of a wrench. [*A bronze medal awarded.*

Stivers & Smith's Light Carriages and Sleighs.

Stivers & Smith, 89 Eldridge street, N. Y.

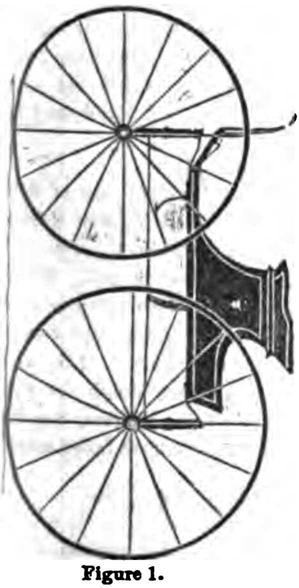


Figure 1.

Figure 2.

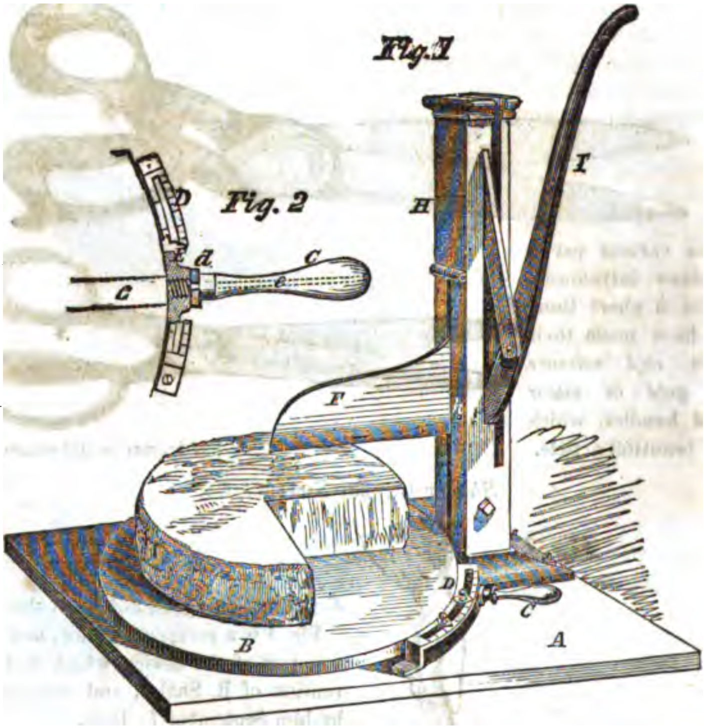
Figure 3.

No. 1 is a new style, but lately introduced, and is called the Snob or Bracket front. The cut represents the body upon full elliptic springs, though many are set upon half-elliptic side springs, as in cut No. 3. They are made either open or closed behind, and with or without panel seat. Weight 210 lbs.

No. 2 represents the same wagon as No. 1, with top, which is so constructed that, upon its removal, no evidence of its existence remains upon the seat, giving the wagon, in every respect, the appearance of No. 1, and entirely removing the objections which have been made to all shifting top wagons heretofore constructed.

Stevens' Cheese Cutter.

De Witt Stevens, Newark, N. J.



The machine consists of a knife operated by a lever descending upon a revolving platform upon which the cheese is placed. Fig. 1 gives a perspective view of the apparatus, and fig. 2 exhibits the mode of operating the platform. A is the common counter in a store, on which the revolving platform turns round a pivot at its center. By this means any part of the cheese is brought directly under the knife. The knife, F, is fastened to a slide in the middle of the standard, H, said slide being connected by the lever, I, by the rod, J. By means of this lever, the knife is easily and quickly depressed upon the cheese, making a clean, straight cut to the center. The lever (or handle) is inclosed in the standard, out of the way, except in the act of cutting.

In the scale, D, an arrangement is added to this cutter, by which *any one* can make a very close approximation to the weight. This scale, D, is divided into 500ths of the circumference of the platform, and has a slot with sliding indexes, which can be set to any number of parts. Five hundred divided by the number of pounds weight of the cheese, will show the distance at which these indexes must be placed to include one pound of that cheese—and so of greater or less weights. This feature of the cutter, though subordinate, is well liked on trial.

The standard of the machine is made of iron, the knife is strong, securely fastened, and neatly tinned to prevent rusting, and the whole gotten up in a neat and durable style. [*A diploma awarded.*

Clough's Revolving Light-House Fly Trap.

J. S. Clough, 231 Pearl street.

The clockwork is in the base, from which rises the central column, which is covered with sand, and on which the bait (molasses and sugar) is to be spread with a sponge. A rotating spindle passes through the center of this, and carries a platform on the top, from one side of which the catcher projects downwards, close to, but not in contact with the sanded cone. On the top of this platform a cage, containing water in its base, is placed, into which the flies are attracted by the light, when started from their enjoyment of the sweets of life by the catcher. When the spring is wound up and the trap baited, the catcher and cage commence revolving around the sanded cone, and the flies are caught, made prisoners, and finally find a watery grave.

[*A diploma awarded.*

Bartlett's Old Java Coffee Pot.

Bartlett & Lesley, 426 Broadway.

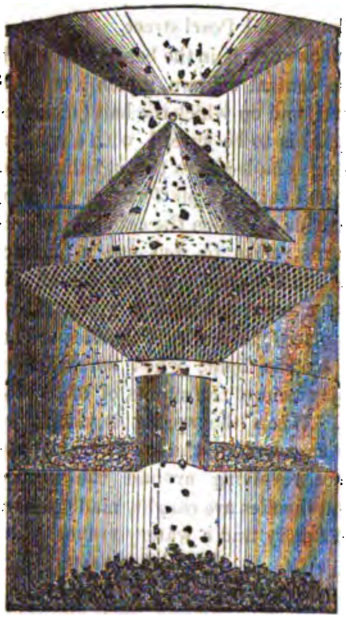
The above coffee pot is claimed by the patentee as possessing many advantages, viz: Making better coffee with one-third less, can be boiled longer without loss of flavor, it is easily cleaned, and not liable to get out of order

Place the handles of the cold water cup R over the lower one, I; then cold water is poured into the reservoir R, until it overflows at F, and fills the reservoir I, I. The coffee and egg are put into the coffee pot in the usual manner, and boiling water poured in; then the condensing reservoirs, I I and R, are put on as represented, and the coffee pot placed over the fire to boil from thirty to sixty minutes. When done, take the upper reservoir R off, and pour a teacupful of *cold water* in the coffee; place the cover on, and take the coffee pot immediately from the fire, when the coffee is ready for use.

1 quart,	$1 25 each.	4 quarts,	$2 75 each.
1½ "	1 50 "	6 "	3 25 "
2 "	1 75 "	10 "	4 50 "
3 "	2 25 "	16 "	7 00 "

[*A silver medal awarded.*

Cummings' Patent Self-Acting Ash Sifter.



Allan Cummings, 420 Fourth avenue, N. Y.

It can be seen by the construction of this sifter, that the dust is prevented from escaping while in operation.

When the ashes and cinders are thrown in at the top, they are diffused by the cone, and fall upon the seive, which is also conical, where a perfect separation takes place, by the fine dust falling through the meshes of the seive, while the larger rolls over into the lower pan.

[*A diploma awarded.*

Pollard & Seeley's Empire Washing Machine.

Mayher & Co., agents, 54 Vesey street.

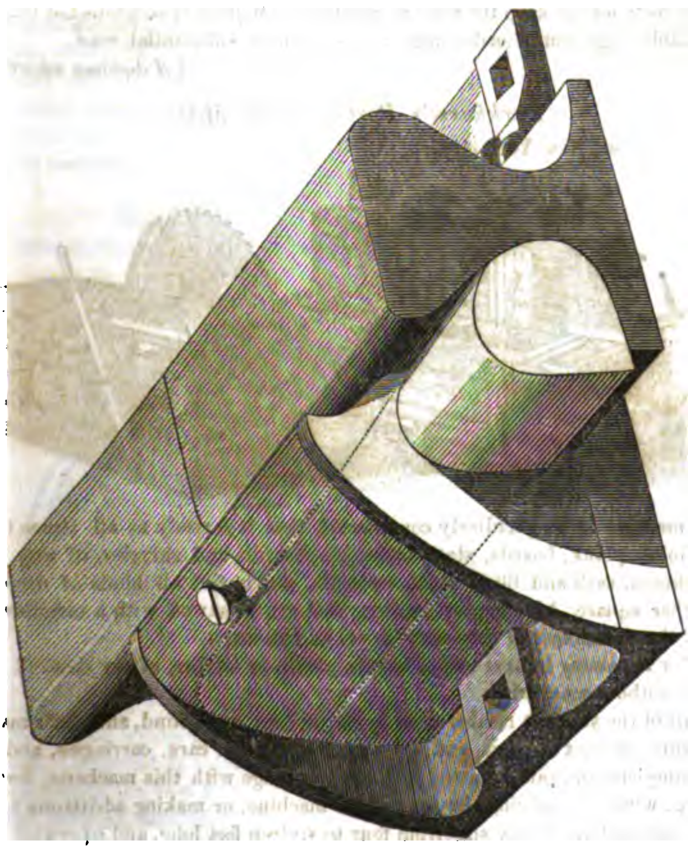
It is light, portable, durable, simple in construction, not liable to get out of order, easy to operate; will wash twelve shirts or their equivalent—say thirty yards of cloth—in from five to fifteen minutes, according to their condition; and can be operated on by a boy or girl of twelve or fifteen years old. Will wash bed-quilts, carpets, and the heaviest articles perfectly clean, and equally well the finest fabrics, and all kinds of clothing. It rinses clear. Will not injure the most delicate buttons or wearing apparel. One of its chief recommendations is that it saves the wear of the clothes, occasioned by the use of the rubbing-board, and it will save more than half the time, labor, and expense of washing by hand. Price $10.

[*A diploma awarded.*

Hay's Railroad Chairs.

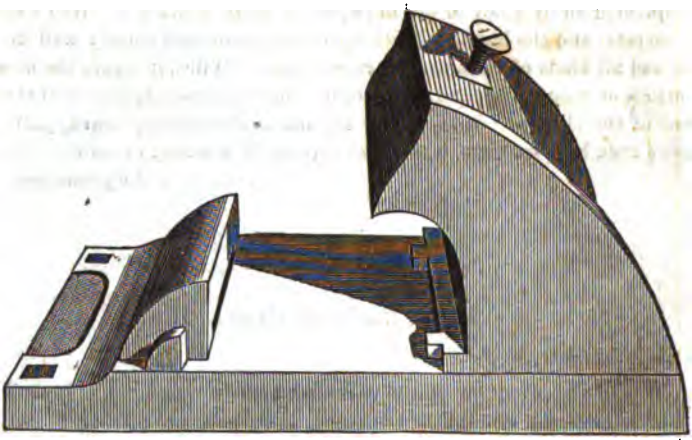
Adam Hay, Newark, N. J.

The object of the invention was to construct a chair which, while it shall afford the usual convenience for laying the track, and the usual rest, shall also firmly support the outer flange of the rail, and by means of a wedge combine the chair and rail perpendicularly as well as laterally together in one piece, in such a manner



Hay's Railroad Chair.

that the rail cannot batter, the chair break, or the wedge come loose, and our expectation has been fully realized, and faithful trial by the New Jersey railroad for the past year and a half has shown:



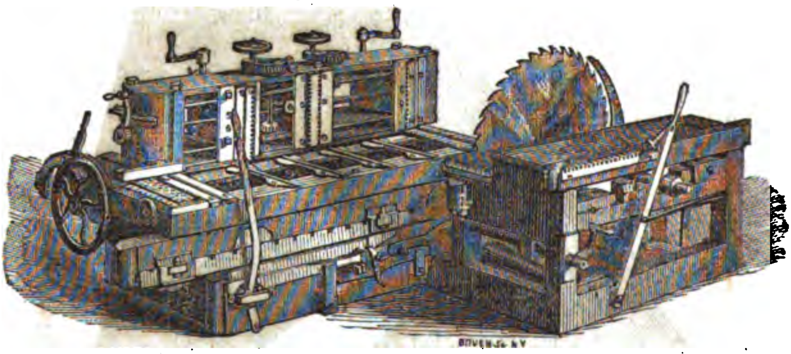
1st. That it costs less to lay track than with any other kind of chair or joint, for if the rails be placed in the chair, and the key driven, it must be right.

2d. It costs less to keep the road in repair, as the joint is so protected that it is not so liable to get out of order, and makes the most substantial road.

[*A diploma awarded.*

Parkhurst's Portable Saw Mill.

B. E. Parkhurst, New York city.



This machine is so peculiarly constructed that it is ready at all times to saw timber, joist, plank, boards, slats, laths, clapboards, and shingles, of any length and thickness, sash and blind stuff, treenails, and in fact all kinds of dimension stuff, either square, beveling, or angling, that can be sawed with a circular saw. Some of the advantages of this machine are as follows:

1st. For re-sawing lumber out of boards, plank, or timber, of any desired width or taper, without measuring.

2d. All of the straight lumber used by carpenters, sash, blind, and door makers, millwrights, cabinet makers, and the manufacturers of cars, carriages, and agricultural implements, can be sawed to good advantage with this machine, from the round log, without removing any part of the machine, or making additions to it.

3d. It can be built of any size, from four to sixteen feet long, and operated either by steam, water, or horse power (which is practicable in some cases), and can be taken apart in twenty minutes, ready to move from place to place.

4th. With this machine five and six inch clapboards are sawed from any kind of lumber that is seven inches in diameter, or larger.

5th. Feather edged "siding" can be sawed of any width or thickness

6th. The operator has perfect control over the carriage, and with one shipper handle causes it to move forward or backward, or lets it stand still, or leaves it free from gear, so that it can be moved by hand. There is no steel nor iron spring on this machine.

7th. The dogs can be thrown back within five-eighths of an inch of the head-block, so that a two-inch plank can be held and split in the centre, or they can be instantly thrown out so as to hold a crooked log. The same dogs can be brought within sixteen inches of the dog in the centre of the head-block, or extended to the ends, according to the length of blocks or logs to be sawed. The central dog is entirely out of the way when not wanted, but can be instantly thrown out, and two blocks or logs be held at a time between it and the end dogs. The feed can be varied while the machine is in operation.

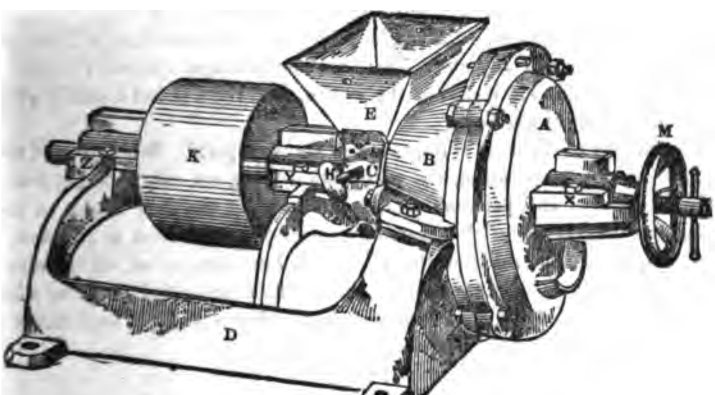
8th. The saw arbor is so constructed that the saw can be removed, and a thin saw with a large collar on the back side, suitable to saw veneers, can be put on in five minutes; or this may be removed and a cutter head put on, and then the machine is a side-planing machine, all ready to plane square, beveling, or tapering.

The smallest mill, which takes a log four feet long or less, with 34-inch saw, all complete, ready for use (except the driving belt), is $450.00, and $10.00 for each additional foot. Weight of four foot mill, 2,400 lbs.; each additional foot will weigh about 300 lbs.

The mill can be belted from below or above, or horizontal directly from the engine to the arbors. [*A large silver medal awarded.*

Ross' Improved Conical Burr Stone Mill.

Chas. Ross & Co., 211 Centre street, N. Y.



This mill consists of a solid cone runner of French burr stone, revolving on a horizontal shaft within a concave, composed of burr stone, firmly set within a cast iron shell, the grinding surfaces being, with exactness, fitted to each other.

A represents the *head plate*, secured to the concave by screw-bolts.

B, the *concave*, secured to the cast iron frame D, by screw-bolts.

C, the *journal hopper* (this is not to be unscrewed from the concave).

E, the *grain hopper* (and may be removed at pleasure).

H, the *thumb screw*, that adjusts the swing valve as it beats against a revolving feeder, within hopper C, thus regulating the feed to the stone.

X Y Z, are the *journal bearings*.

K, the mill *pulley*, to revolve with the sun, or as indicated by the painted arrow. It takes an attachment by belt from a horizontal drum, and should be distant from it nine or ten feet; or may be attached to a vertical drum by a belt to be half twist.

L, the *regulating screw*, having *counter sink* that contains a thick leather washer at the end next to the stone spindle; this *washer* receives the end pressure of the stone spindle, and when worn thin by use (say once in a month or two), needs to be replaced by a thick and solid piece of leather.

M, the *jam nut* or wheel, to steady regulating screw L.

The inventors furnish the following particulars:

Size No. 2 weighs only about 220 lbs., and is intended to meet the wants of the farmer and planter; can be driven to good advantage by two horses.

Size No. 3 weighs about 350 lbs., for grinding corn and feed, or wheat in a small mill.

3d. The peculiar shape of the grinding surfaces affords a nicer adjustment than is possible on any other mill, consequently this mill will grind closer, and more even, than any other. For this reason they will make a better yield from wheat, and are far superior to any other for grinding paints and colors, also lamp-black and varnish for printers' ink.

4th. Their light weight and simplicity, render them eminently portable, so much so that they have been used by an invading army, to convert the enemy's grain into flour for their own use, the mill being taken with them each time they moved their camp.

Size No. 4, 450 lbs., as proved by experience, is the best size for flouring purposes. With four horse power, and running 1,200 revolutions per minute, will grind eight bushels of wheat per hour, and will grind cooler, leaving the flour consequently livelier, and will make a larger yield than ordinary stones.

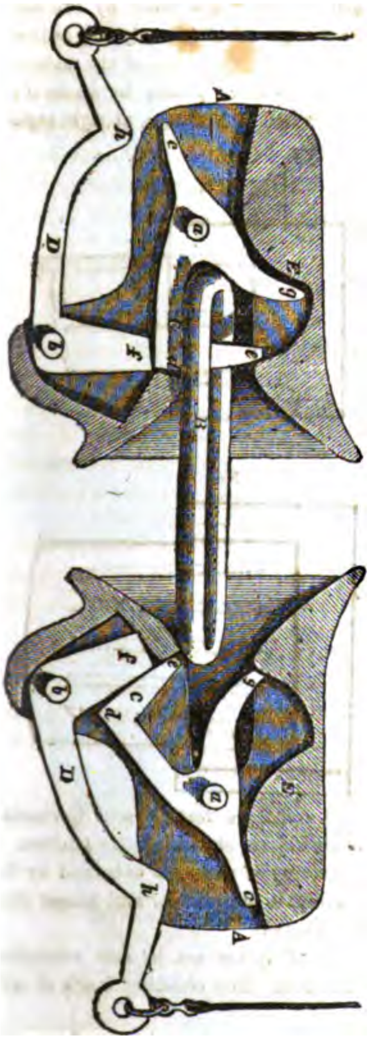
There are numerous advantages resulting from the use of this mill:

1st. The same amount of work can be performed with less than half the power required by flat stones of any size. There are two principal reasons for this. The grinding is done within six inches of the centre, and there is but a small quantity between the surfaces at one time.

2d. The quality of the flour is improved in many respects. Being ground cooler, there is less loss by evaporation, the evaporation being not only a direct loss, but is the direct cause of the perishable nature of most of the flour made on the old principle; in confirmation of this theory, we would call attention to the fact, that we have samples of flour made on this principle, three, five, seven, eight, nine, and ten years of age. It is the unanimous opinion of all impartial persons who are conversant with the subject, that these mills make clearer, livelier, and richer flour than any mill on the old principle.

Lapham & Burns' Automatic Car Coupling.

C. A. Durgin, 335 Broadway, N. Y.



The engraving gives a vertical section. A represents the bumpers, which are arranged so as to receive the hook and lever. B is the link. C is a tilting hook, which has its fulcrum at *a*, and is so shaped as to readily admit the coupling link with the proper play, while the lower part projects back far enough to be struck by the knee of the lever D, at the point *c*, when it is raised. D is a crooked weighted lever having its fulcrum at *b*, one end of which, *f*, supports and retains the hook securely when the link is inserted. The projecting lug, E, made on the bumper, prevents the hook C from backward motion beyond the proper point by force of the link during the coupling.

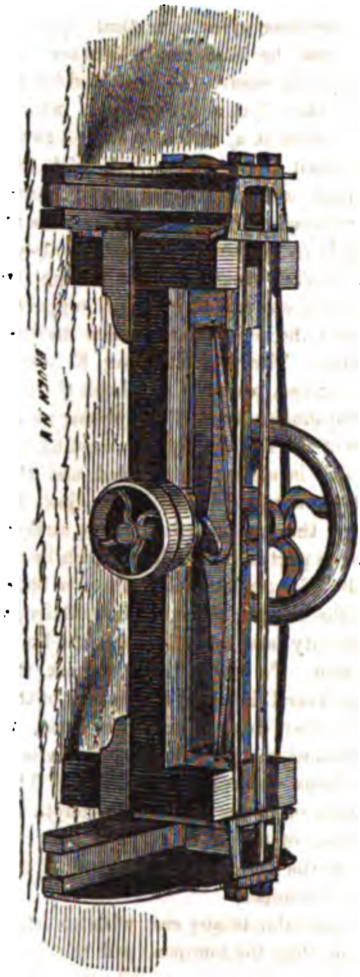
One side is shown as coupled, and the other in the act of coupling. The link, B, slides up the bell mouth until it strikes against the part of the hook *g*, which being above the fulcrum, is readily thrown back against the bumper, when the lever D drops by its gravity, and securely holds the hook in position. To uncouple or release the link, the lever D is raised (by means of the cord or other device) until the knee, *h*, strikes against the part of the hook *e*, which tilts the hook and releases the link. The link is held in proper position to couple by the friction of the parts *e* and *f* and the gravity of the lever D, as shown in the right hand bumper.

It is applicable to any car, with no other alteration than the bumper, and the ordinary link is used.

[*A diploma awarded.*

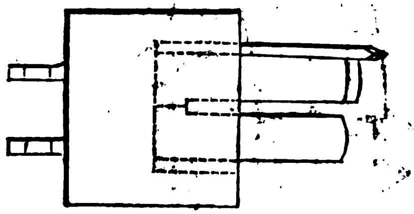
Greene's Double-Acting Horizontal Wood Splitter.

D. A. Greene, No. 227 Sixth avenue, N. Y.



Attached to the crank shaft by two connection rods are a set of (one slabbing and five splitting) knives at each end of the machine. The wood passes these knives by means of a strong leather belt or carriage, at right angles to the knives.

No. 1.



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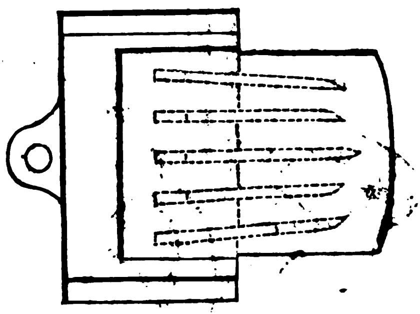


Figures 1 and 2 are vertical and horizontal views of the knives, showing their position.

A great saving of power is obtained by the slabbing knife, it being wider and longer than the slitting knives.

Both sets of knives act in one revolution of the crank, but only one set at the same moment. The slabbing knife of each set, acts in advance of he splitting knives.

From one to one and a half hor e power is sufficient to drive the machine, and it is claimed that it will split from *thirty to forty cords of wood per day.*

[*A diploma awarded.*

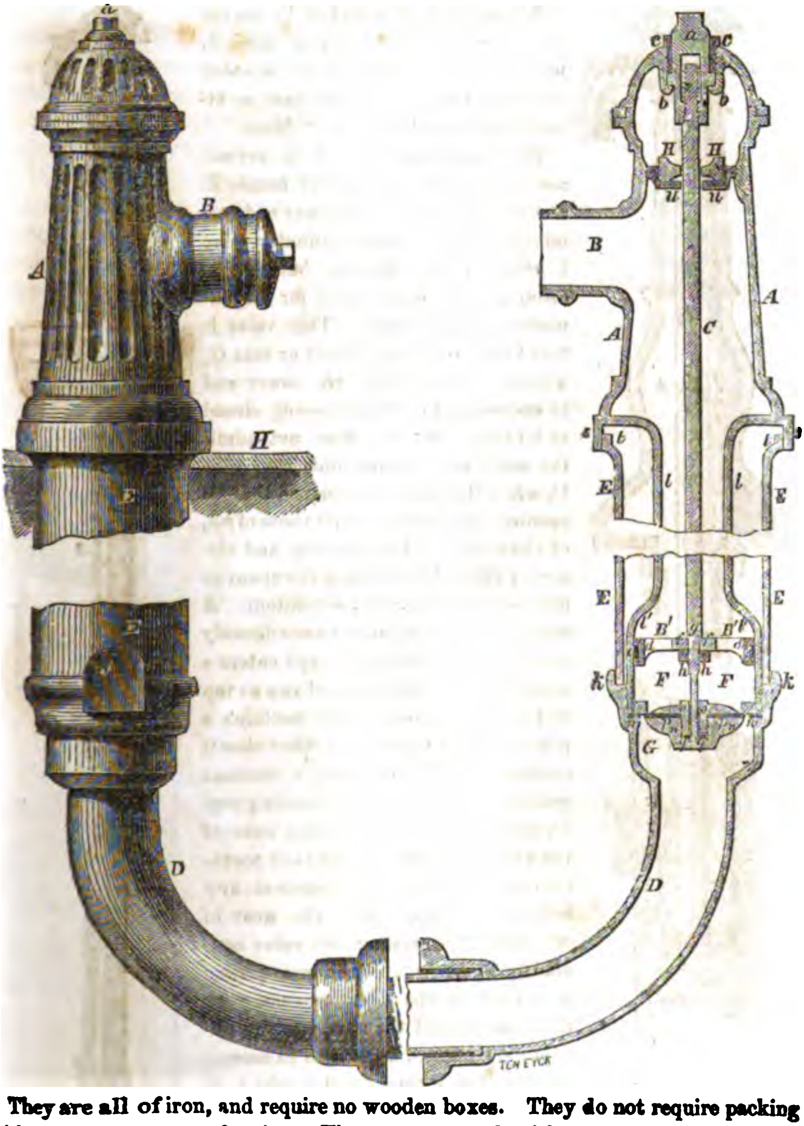
Race & Mathews' Fire Hydrants.

Race & Mathews, Seneca Falls, N. Y.

They are perfectly anti-freezing, as no water can remain in the hydrant under any circumstances whatever, when shut off, not depending upon any outside rods for opening and closing water orifice.

The surface waste canno run back into the hydrant (as is the case with the old ones, causing hem to freeze and burst in winter), but on the contrary, they are so arranged as not only to carry off the surface water, but they also drain the ground for considerable distance around the hydrant, keeping it perfectly dry.

The frost cannot heave the hydrants, as the outside case E is detached, and has room to play up and down two inches, thus accommodating itself to the ground without disturbing the hydrant or breaking the connection.



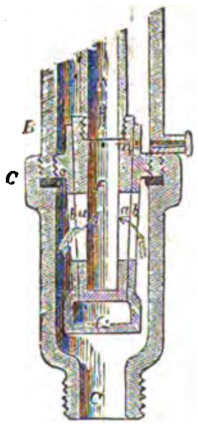
They are all of iron, and require no wooden boxes. They do not require packing with straw to prevent freezing. They are operated without removing the cap on top, the revolving nut *a* working the valve-rod C up and down within it.

In case of any obstruction in the valves, or for repairs, they can be unscrewed from the base or elbow, D, leaving case E undisturbed in the ground, and replaced in a few minutes, requiring no excavating or taking up of pavements or sidewalks.

They are ornamental and tasty in appearance. With our new style of base (not shown in cut) we get the valves five feet below the surface, *running them down to bottom of branch-pipe*, giving a very free water-way, and saving from one to one and a half feet depth of excavation in laying branch-pipe.

Race & Mathews' Yard Hydrants and Street Washers.

Race & Mathews, Seneca Falls, N. Y.



The stock A is attached by means of a screw to the external pipe B, which connects in the same manner with the base C; to this base is attached the pipe leading to "Main."

The conducting pipe D is permanently attached to spout or nozzle E, and turning with it, its lower end terminating with a conical tubular-valve F, closed at the bottom, but having openings, *a a*, on its sides for the admission of the water. This valve is fitted into the conical shell or seat G, which is screwed into the lower end of enclosing tube B, and being closed at its lower end, G, does not admit the water into B, and only into tube D, when the valve is so turned that its openings, *a a*, coincide with those of *b b*, of the seat G. This opening and closing is effected by turning the spout or nozzle E a quarter of a revolution. A stem, H, from the nozzle rises directly in a line with the pipe D, and enters a socket in the under side of cap at top of hydrant. This socket contains a piece of India rubber, or other elastic material, which, exerting a constant gentle pressure on the conducting pipe D, and compensating for any wear of the valve F, insures its perfect operation at all times, and against any liability of leakage from the wear of the cock, by keeping the valve constantly to its seat. The large opening in the side of the stock, necessary for the admission of the nozzle to the position it occupies, as well as to accommodate the movement by which it opens and closes the valve, is concealed by the broad ring or washer L, having only a side opening through which the nozzle passes. This washer revolves with the spout freely, and entirely covers the opening in stock.

A drip or waste orifice, *m*, is provided in the valve F, and its seat so arranged that the two shall coincide only when the side-ports or valve-openings, *a a*, are closed, so that no waste of water occurs while the hydrant is in use, and no water can remain in the hydrant within four feet of surface when shut off, effectually preventing the possibility of freezing in cold weather. This waste water is conducted off by the tube *m*, to which a small pipe of lead or gutta percha can be attached, if desired, leading to the nearest drain.

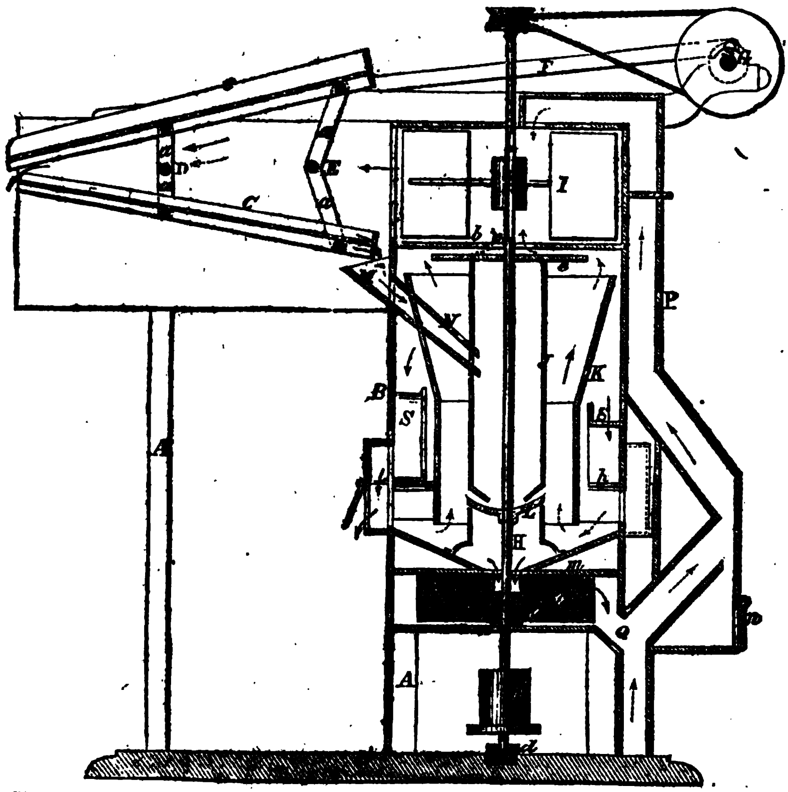
The seat G is made closed at the bottom, to prevent the pressure of the water from acting upward against lower end of valve F, the entire pressure being merely at the openings, *b b*, at the side, so that the valve is rendered perfectly tight, with but little pressure from above in addition to its own weight, and consequently works with much greater ease, and is less liable to wear.

The valve can be readily taken up, in case of any obstruction, by removing the cap from upper part of stock or standard, and raising the spout and pipe D.

The street washers are constructed on precisely the same principle, with the necessary change in method of attaching hose and operating at level of sidewalk, instead of at top of standard, and are also provided with an arrangement for preventing the frost heaving them, thus rendering them very secure under all ordinary circumstances. [*A bronze medal awarded.*

Tobin's Combined Grain Separator and Smut Machine.

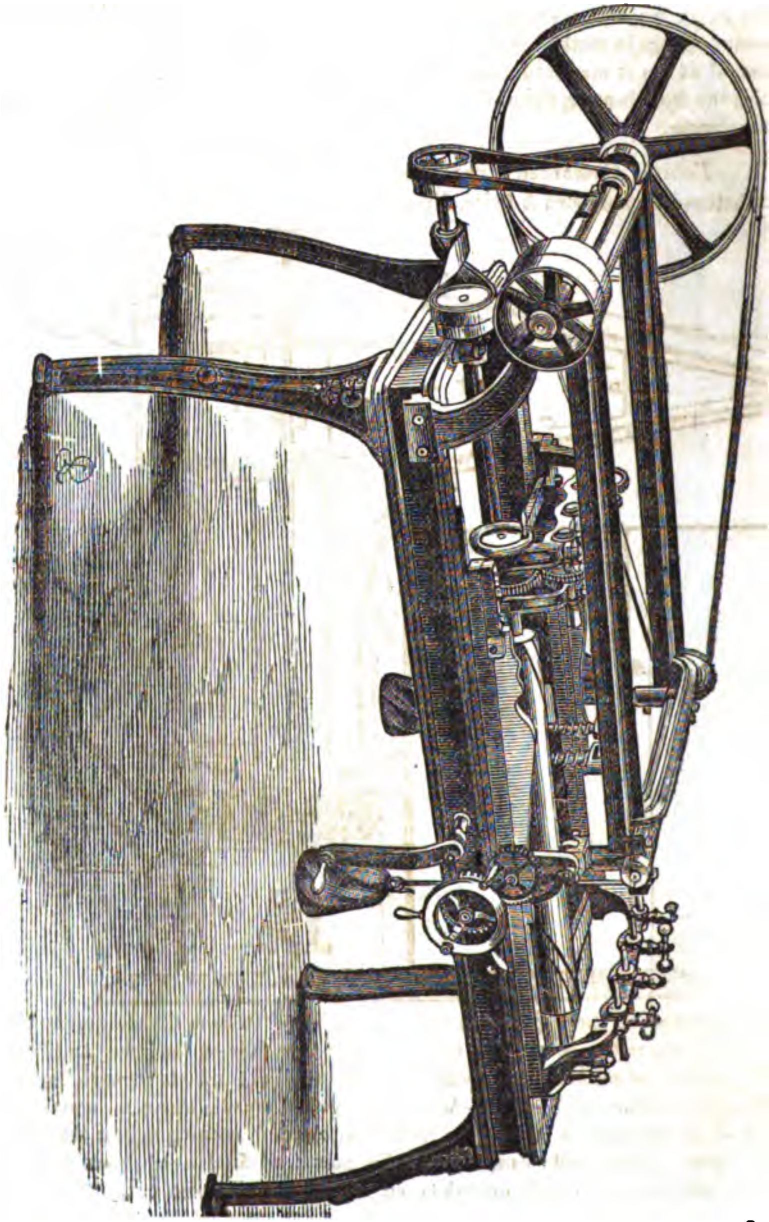
Manufactured by Sandford & Price, Newark, N. J.



The operation in cleaning is thus: The grain is taken from the elevator to the top sieve C, where the coarse stuff is removed; it then falls on the lower and finer sieve C, where the sand and fine seeds are taken out; it then passes through hopper M to the first separator J and K—*here is the grand point*—where an equalized current of air operates on it in such a manner as to admit nothing lighter than the grain to pass. Smut balls *cannot* pass this point; all foreign substance is here removed, and here smut balls are taken out whole, and all taken out, before the grain goes to the scourers, thereby saving the grain from being scoured while the smut is with it. It then passes to the scouring chamber O, where all dirt adhering to it is entirely removed, together with the tip and blow, *without breaking the grain*, after which it passes to another separator, which *completely* cleans the grain from whatever dust or impurity may have adhered during the former passages, and leaving it in a clean and perfect condition for flouring. [*A large silver medal awarded.*

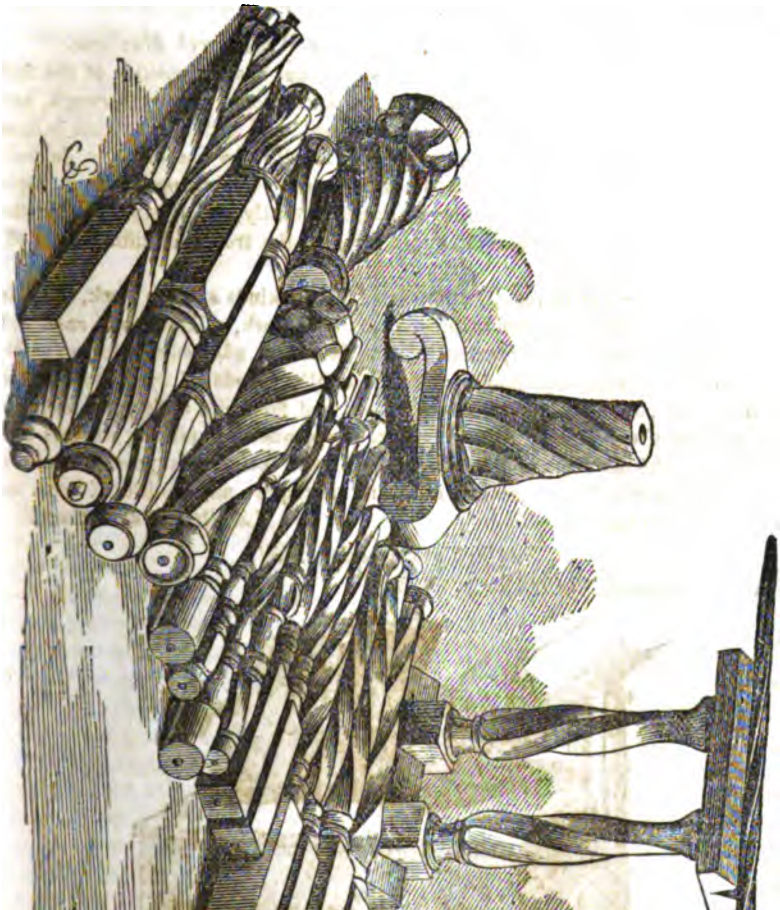
Huntoon's Carving Machine.

Wm. M. Cassidy, general agent, Albany, N. Y.



This machine is for cutting serpentine fluted work, of any desired style or pattern; a kind of work never before done by machinery.

The machine is arranged so as to cut four pieces at a time, and taper down to any desired size, by means of lowering or raising the cutters; doing the work sufficiently smooth, without sand-papering, for ordinary kinds of furniture. A boy can operate the machine.



The above engraving represents some of the various kinds of work done by this machine, consisting of bedstead posts, stretchers, and balusters, stool pillars, table legs, stair balusters, piano forte and seraphine legs, desk and counter legs, newel posts, &c.

[*A silver medal awarded.*

Gray & Woods' Improved Planer.

Gray & Woods, Boston, Mass.

This cut represents the machine as recently improved, with solid iron posts and cross head, in place of wood. Also showing the machine with the feed rolls, or Woodworth attachment, when not in practical use. The frame on which they are hung having been swung back on its hinge to allow the bed or carriage to run back and forth, the lumber being dogged in order to plane straight and out of wind.

Gray and Woods' Planer, shown as a Woodworth Machine.

This cut represents the same machine as first, but has the position of the feed rolls changed or swung into their place for use and a board running through, and planed in the same manner and with equal speed, and better even than is done with a common Woodworth machine, thereby making the one machine do both the work of the Woodworth and the Daniels planer. The change from one style of machine to the other being effected almost instantly, by simply swinging the roll attachment back or forth on its hinge, without the trouble of lifting them off, as heretofore applied.

These machines will be readily appreciated for all kinds of shop work, such as carpenters' shop work, pattern making, piano forte work, cabinet work, sash and door manufacturing, ship carpentering, &c. It can be adapted to sticking architraves, cornices, base mouldings, and various other kinds of work, having the advantages of two machines combined in one, and for but a trifle more expense than the cost of one alone. And when once in operation for planing straight and out of wind, the mere cost of the rolls will be all the necessary expense to make a most complete Woodworth planer, as it will not require any additional room or expense for shafting and belting. [*A silver medal awarded.*

Sanford's Excelsior Mill.

J. A. Bennet, agent, 45 Gold street, N. Y.

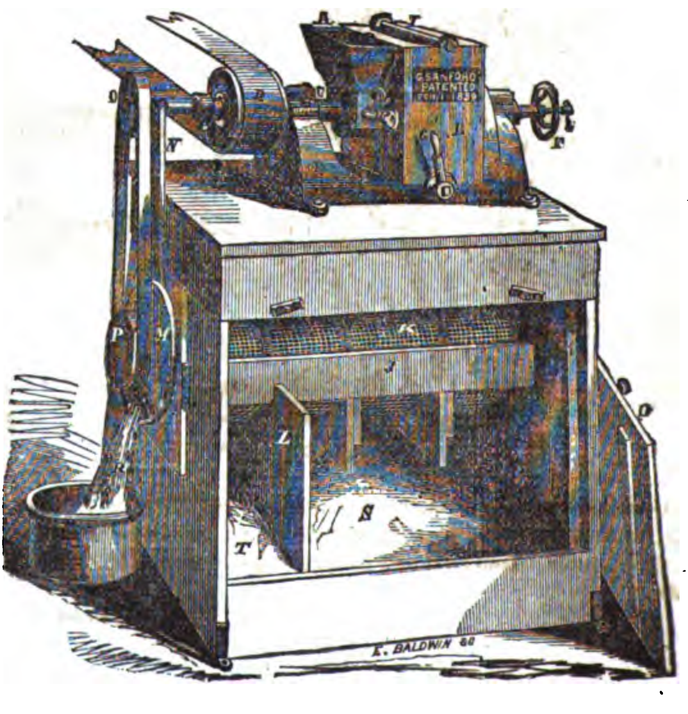


Fig. 8

Interior.

The cuts, and the following description, are thought to be all that is necessary by way of explanation and illustration, to enable any one to form a correct idea of the "Excelsior Mill."

A is the hopper in which the material to be ground is placed. B, a conical French burr stone, immovably secured upon the shaft—see the open mill above. BB, the concave stones in two solid pieces, encased in iron, are placed over the cone, fitting it perfectly; these are the grinding or milling surfaces. F, the adjusting screw by which the grinding cone is forced towards the shell to make the mill grind finer or coarser, as may be desired. D, a pulley upon the end of the shaft to which the grinding cone B is attached, and by which it is operated. K is a bolt into which the ground material is passed to separate the ground product into the various grades required—the middlings falling into the bin T, and the fine flour into the bin S, while the bran is passed out of the end of the bolt into a receptacle placed to receive it. The bolt is stationary, but brushes are operated on the inside, to drive the flour through, by a belt passed over the pulley O on the main shaft, and over the pulley P on the bolt shaft.

The advantages of the construction of the conical grinder and divided shell herein described, are, that the mill grinds the best flour or the coarsest feed by a *turn* of the adjusting screw; that it heats the meal *less* than the flat stone mill; that it can be taken apart and dressed by any person of ordinary intelligence; that it can be operated with less power than any other mill of equal capacity; that it is more compact, simple, and less liable to get out of order than any other mill now before the public; advantages that will be appreciated by all who have used mills that are complicated in construction, and that require the attendance of a practical and experienced miller or millwright to put them in order.

From actual experiment, made with Wheeler's endless chain railway power, it is found that *with one horse*, three bushels of fine Indian meal per hour can be ground from the hardest corn, which is equal to the work of a four and a half feet flat-stone mill, under an eight feet head of water, on a horizontal wheel.

Two horses, with Sanford's new patented "Anti-friction horse power," will grind with this mill five bushels meal the hour.

From fifteen hundred to three thousand bushels of corn can be ground with the mills, as delivered, without dressing, after which any intelligent man can put in the same dressing, in a few hours, by using a sharp pick.

Corn meal and feed mill, - - - - - - - - -	$100 00
Flouring mill, same size, without bolt, - - - - - - - -	100 00
do with our improved bolt, - - - - - -	180 00
Large size flouring mill, without bolt, - - - - - - -	170 00

[*A large silver medal awarded.*

Edney's American Pump.

James M. Edney, 147 Chambers street, N. Y.

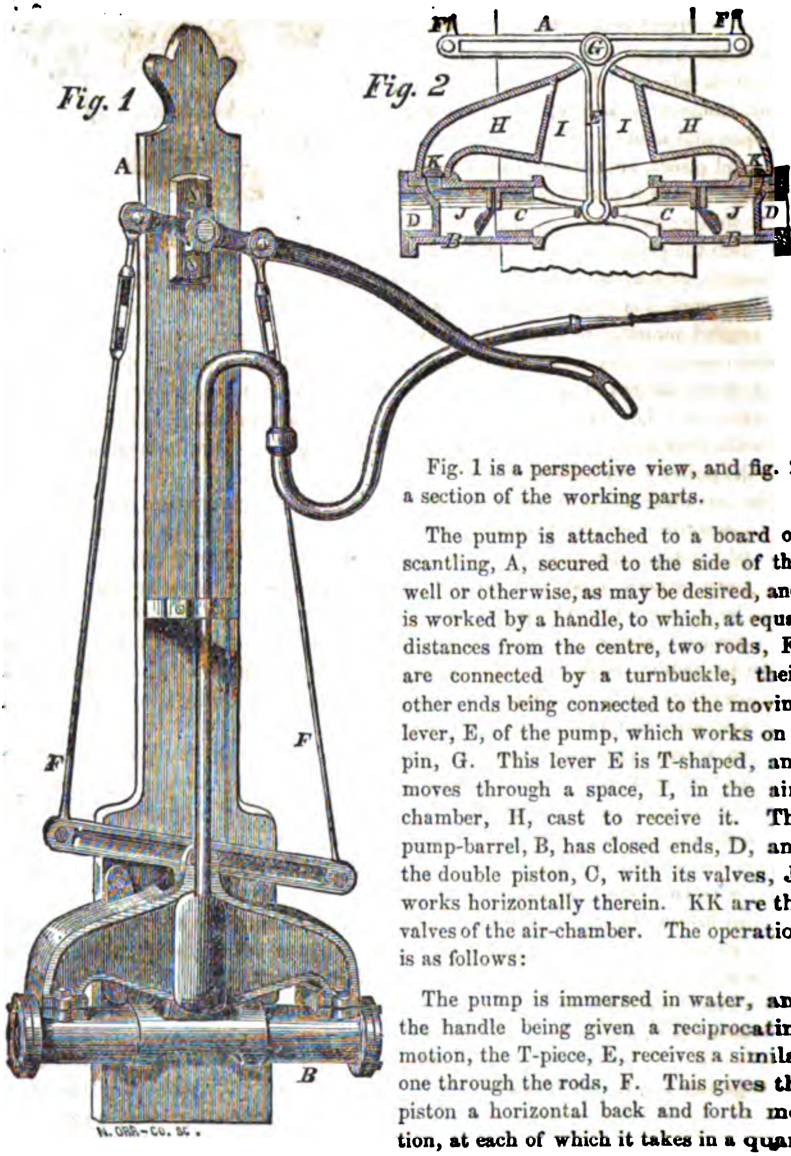


Fig. 1 is a perspective view, and fig. 2 a section of the working parts.

The pump is attached to a board or scantling, A, secured to the side of the well or otherwise, as may be desired, and is worked by a handle, to which, at equal distances from the centre, two rods, F, are connected by a turnbuckle, their other ends being connected to the moving lever, E, of the pump, which works on a pin, G. This lever E is T-shaped, and moves through a space, I, in the air-chamber, H, cast to receive it. The pump-barrel, B, has closed ends, D, and the double piston, C, with its valves, J, works horizontally therein. KK are the valves of the air-chamber. The operation is as follows:

The pump is immersed in water, and the handle being given a reciprocating motion, the T-piece, E, receives a similar one through the rods, F. This gives the piston a horizontal back and forth motion, at each of which it takes in a quantity of water and forces it into the air-chamber, and thence through the pipe upwards, to any height. To this pipe a hose is here attached to show how it throws water, &c.

[*A diploma awarded.*

REPORT ON SEWING MACHINES.

We, the undersigned, judges on Sewing Machines, appointed by the Managers of the Thirty-first Annual Fair of the American Institute, held at the Palace Garden, in the city of New York, October, 1859, beg leave to report:

That we have carefully examined the articles submitted to our inspection, consisting mainly of machines for the purpose of sewing; and in the case of these machines, with especial reference to qualities of construction and working, and the character of the work done by them severally.

That, apart from the minor differences which help to give individuality to each of these machines, we find other wide and essential differences between them, in some or all the particulars above referred to, and to such an extent, as, for most practical purposes, to warrant our grouping them in a certain number of classes.

That, therefore, in our opinion, any award as to the merits of these machines, taken promiscuously, and without reference to their leading features of agreement or difference, must not only fail to convey any really useful information to the purchasers of sewing machines, who are, in reality, the parties most interested in our decision, but could hardly do justice to the exhibiters, whose several claims could not thus be properly respected.

That, being convinced that the features of prime importance in any machine of this kind, are those directly connected with the method of making the stitch, and the elasticity, permanence, beauty, and general desirableness of the stitching when done; and that the purposes of purchasing make it desirable also, that we should discriminate in regard to the kinds of fabric for which the several machines are intended; we have, therefore, classified those submitted to our examination under the four following heads:

1. Shuttle or lock-stitch machines, for family and light manufacturing purposes.
2. Shuttle or lock-stitch machines, for heavy and general manufacturing purposes.
3. Double chain-stitch machines, for family and light or heavy manufacturing purposes, according to size.
4. Single thread, or tambour-stitch machine, for family and light work generally.

That, having thus classified these machines, we have been guided in coming to a decision upon their comparative merits, by observing the degree in which they severally receive, or fail to receive the good qualities of the stitch above named, and also by considering the simplicity, strength, quietness and accuracy of working of the machinery; the ease of working, and especially the practicable speed, which, when combined in the highest degree, give the greatest economy of the power, i. e., of the strength of the operator; the number of kinds of thread used, and the facility of using them; the kinds of work done, and of fabric successfully worked; and, so far as that came within our province, the general good quality of the work done; together with some other points entering into the conception of a perfect sewing machine, which our space does not suffice to mention.

That, along with certainty of working, variety of kinds of work done, and facility of passing from one of these to another, we have estimated two points to be of especial importance, whether for family or manufacturing works, namely: 1. *A high practicable speed*, enabling the operator to turn off work with rapidity, if desirable; 2. *Freedom* of the stitching, when finished, from *projecting* on either side of the fabric—a result that, where it occurs, must, in our opinion, usually impair the durability of the seam, and often the beauty of the garment or other article so stitched.

That, therefore, while by 1st, 2d, 3d, and 4th classes of machines, we do not mean to express an actual and positive order of merit, of the classes as such, but to consider these classes as in some respects ranking side by side; yet, in other respects, we believe that in a degree such order of priority of merit does actually hold; since we are led to consider the machines making the shuttle or lock-stitch as doing generally work presenting the greatest number of desirable qualities, and giving for general purposes the best satisfaction; as also to look upon the ridge of thread left on the back of the fabric, by double chain-stitch machines, as being objectionable for some kinds of work, while, however, some other machines can be thus used very successfully for embroidering purposes; and to regard the tendency to raveling in all single thread stitching, as hitherto executed, as constituting a serious objection to its employment for many of the kinds of work required.

That, therefore, guided by these views, and by the printed instructions of the Institute, we decide in relation to the several classes as follows:

In Class I.—Shuttle or lock-stitch machines, for family and light manufacturing purposes, including Nos. 355, 424, 464, 482, 540, 677.

That No. 482 [Wheeler & Wilson's] is the best, and in our opinion deserving of a first premium—its construction being simple and highly perfected, working accurate, speed high, and character of work done excellent, while its price is slightly lower than that of some others in the same list.

That No. 464 [Finkle & Lyon] is the second best, possessing in a high degree all the qualities desirable in a machine for family and light manufacturing work, and in our opinion worthy of a second premium.

That No. 355 [Ladd, Webster & Co.] is the third best; and we beg to state particularly, in respect to this machine, that for certainty and beauty of working, for the excellence of the stitch, the fineness of thread it can use, as well as for other points of merit, it has no superior; so that did it at the same time possess in a higher degree speed of working, we should have felt compelled to award to it a place higher in the list. Even with the medium speed now attained by it, we consider this machine deserving of high commendation.

That Nos. 424, 540, and 677 have been examined, and are not recommended for premium.

In Class No. II.—Shuttle or lock-stitch machines, for heavy and general manufacturing purposes, including Nos 376, 355, 464, 541, (some of these being entries by the same parties as in class No. I, but of the larger styles of machines).

That No. 376 [First & Frost] is the best, and in our opinion deserving of a first premium; and we desire very particularly to commend the mechanical ingenuity and skill evinced in this machine, the novel and excellent contrivances employed for giving movement to the needle-bar and securing perfection of stitch, and the general accuracy, certainty, ease, and noiselessness of its movements, and to state our conviction that, though quite a recent invention, and as yet finished only in large machines for heavy work, it has in it the capability of becoming also one of our most desirable and useful machines for family sewing.

That No. 464 (Finkle & Lyon), same as second in class No. I, is the second best.

That No. 355 [Ladd, Webster & Co.], same as the third in class I, is the third best.

That No. 541 [Jno. H. Lester] though capable of doing extremely heavy and strong work, has not appeared to the committee to operate with either the degree of certainty or ease desirable for its purposes.

IN CLASS III.—Double chain-stitch machines for family and light or heavy manufacturing purposes, according to size, including Nos. 145, 221, 397.

That No. 145 [Grover & Baker] is the best, and in our opinion deserving of a first premium; the finish, command, certainty, ease, and noiselessness of this machine being worthy of especial commendation, while the stitch is, under all ordinary circumstances, permanent, and in a good degree elastic, being liable chiefly to the objection above made in connection with that of a consumption of thread somewhat larger than in most of the other machines.

That No. 221 [Merrill & La Croix] is the second best, and we consider it to be deserving of a special premium.

That No. 397 [L. A. Bigelow—the Boudoir] is the third best, when regarded as a machine for all family work; while, however, for light work it has many superior qualities, and is recommended also by its greater cheapness.

IN CLASS IV.—Single thread, or tambour-stitch, for family and light work generally, including Nos. 323, 395, 964.

That No. 323 [James Wilcox] is the best, working successfully at a speed attained by no other machine examined by us, and having great beauty of device and movement, but owing to the want of durability in the kind of stitch made, it is not recommended for a premium.

That Nos. 395 and 964 have been examined, and are not recommended for premium.

That, besides the machines exhibited, the articles, consisting of work, Nos. 457 and 938, have not been offered to our inspection; while No. 398, consisting of a jacking guage, we consider for its simplicity, certainty, and utility worthy of especial commendation.

NEW YORK, *October 28, 1859*.

LEVI REUBEN, M. D.,
JOHN A. SCHENCK,
JAMES M. BOTTUM, } *Judges.*

Wheeler & Wilson Manufacturing Company.

For description of these machines, see volume for 1857.

Finkle & Lyon's Family Sewing Machine.

Finkle & Lyon's Family Sewing Machines.

Finkle & Lyon, 503 Broadway.

Family machine, plain finish, $50; extra finish, with cover, $75; extra finish, half case, $80; extra finish, full case, $100.

[*Large silver and silver medals awarded.*

Ladd, Webster & Co.'s Sewing Machines.

Ladd, Webster & Co., 500 Broadway, New York.

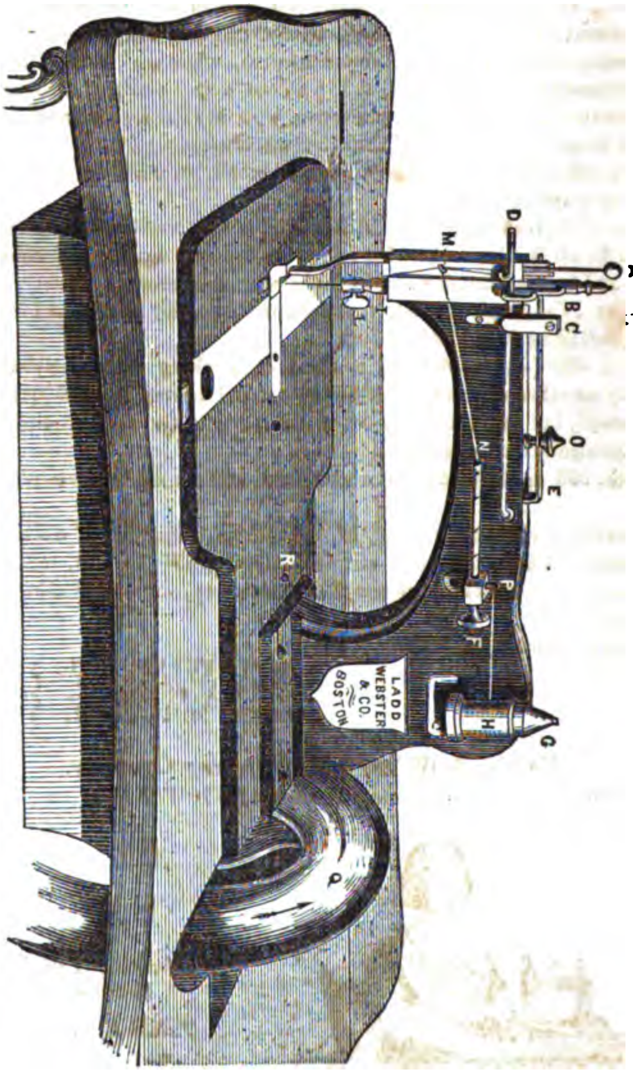


Figure 1.

The engravings represent one of these machines Fig. 1 is a perspective view from above. Fig. 2 is a view of the working parts under the table.

In fig. 1, R is the base plate, which rests on the table, and which carries the hollow fixed arm to and within which the working parts are attached. These consist of the needle-bar I, in which the needle is secured by the thumb-screw L. The needle-bar at its upper end carries the "controller" B, which governs the motion of the "slack-thread wire," D, taking it by the lifting motion into the grasp of the "finger-spring," C, which holds it, and keeps up the slack of the thread, until the stitch is properly formed, when the controller again presses the wire out of the grasp of the finger-spring, as the needle descends for a new stitch. The tension of the thread is regulated by passing it through the "loop-staple" M, through the hole N, winding it round the bar on which the "tension-screw" F acts, so as to give more or less tension, as required. The "tension-screw" acts in the nut P, which is riveted on the fixed arm. The "presser," the foot of which holds the cloth in place for working, is regulated as to pressure by the "lift-cam" A, the stiffness of the cam being maintained by the "spring" E. O is a regulating screw, by which the elasticity of the spring E is regulated, so as to increase or lessen the stiffness of the lift-cam A. The spool which carries the supply of thread is shown at H. It is free to turn on a wire passing through its centre, and is prevented from rising by a weight, G, placed on it.

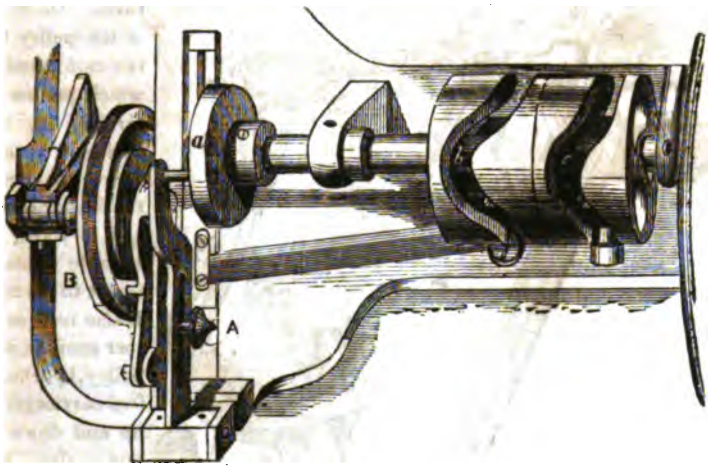


Figure 2.

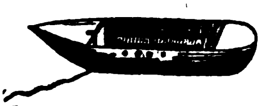


Figure 3.

In fig. 2, A represents the thumb-screw, which, being movable, is used to alter the stitch to any required length. B represents the feed-wheel, which moves the fabric along, either fast or slow, as the machine may be run, the length of the stitch made depending upon the position of the thumb-screw A; *a* is the cam by which the feed-wheel is moved; *b* is a cam for moving the shuttle-bar; while *c* is the cam by which the needle-bar is worked—the whole being put in motion by the shaft of the fly-wheel. The feed-wheel is moved by a short shaft, one end of which connects with a cam. The *bite* is such that slipping is an utter impossibility. Fig. 3 shows Bradshaw's shuttle, which is now used by most sewing machine manufacturers who make the lock-stitch, and without which no machine can be made for general, and especially for heavy purposes. [*Silver and bronze medals awarded.*

Grover & Baker's Sewing Machines.

Grover & Baker, No. 495 Broadway.

This machine was invented in 1851. Its most striking peculiarities are, that it works with two needles, and without noise.

Fig. 1 illustrates the whole machine, except the sliding-plates and part of the bed-plate, which have been removed to show the working parts. Fig. 2 shows an end view. A is the bed-plate, B is the arm which carries the cloth-presser, *a*, whose office is to hold the fabric while the vertical needle, *h*, passes through it, carrying the thread from a spindle, K. The threads are fed from two common spools, firmly fastened on spindles, by cone screws, *q*, and the requisite tensions are regulated by thumb-screw, *p*. The machine is held on the table by four small pins, *b*, fitting into corresponding holes made in small pieces of India rubber fixed to the table, so as to remove all sound, and render the machine "noiseless." C shows the belt on the pulley, by which the machine is operated. On the side of the pulley there is a cam wheel, D, which presses feed-carrier, E, by a spring, *c*, so that as D revolves, E moves the fabric backward and forward, in a suitable manner to feed it to the needle. E also rests on another cam, D, on the pulley, by which the feed-carrier gains an up and down motion, also, which presses the teeth of the feed, *d*, into the fabric, and when they have moved it far enough for another stitch, the feed is dropped down and removed to its former position, without coming in contact with the fabric. The length of the stitch is regulated by a small lever, *e*, which moves in a slot at the top of E, and arrests the motion of E, when it has moved back far enough to grasp the fabric for another stitch. A small pin, *f*, projects from the face of D, close to the periphery, which works in a slot at the under end of a bar, F, giving it a reciprocating motion from its centres, *g*, where it is suspended, on the upper side

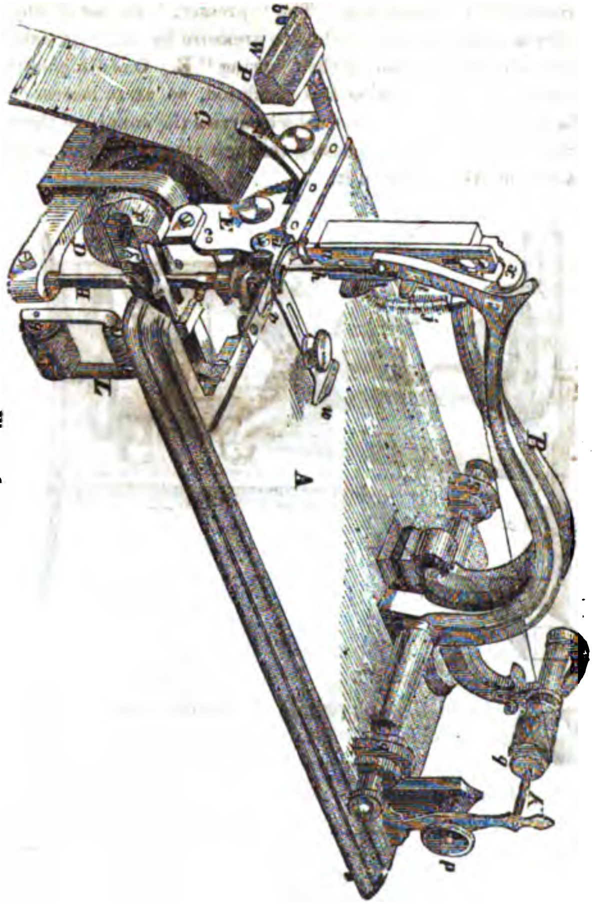


Figure 1.

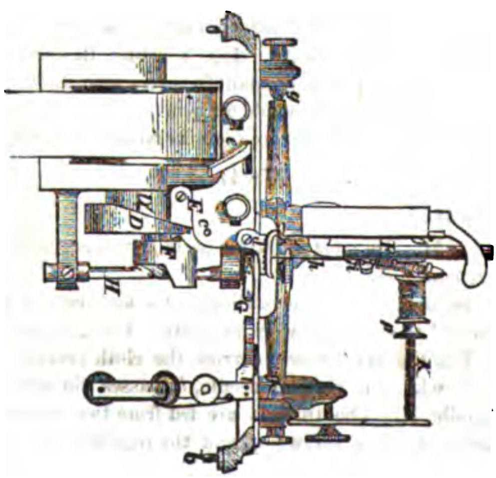


Figure 2.—End view.

of A, which forms the needle-bar, and is indicated by F, into which the needle, *h*, is fastened by a screw, *i*, and is easily removed at pleasure. The upper thread passes from the spool over a spiral spring, *j*, and through a slot in the part holding the spring, and between two small jaws affixed to the end of the needle-bar, which grasp the thread so that it cannot be drawn up by the spiral spring, until the loop has been formed and grasped by a circular needle G, on top of a vertical shaft, H, which passes through a slot at the end of F. H is a spiral post twisted in the centre, like an auger, and as F moves up and down, it causes H to rotate in one direction, passing G into the centre of the loop of the upper thread, and holding it until the vertical needle, *h*, passes down again through a loop thrown out by the under thread carried by G, when H retrogrades by the same means, to its former position. The circular needle, G, is fed from a spool placed in a frame, L, suspended from the bed-plate A, by a small dove-tail slot, *l*, so that it can be removed at pleasure by simply drawing one of the sliding plates. The hemmer, for turning down the raw edges of the fabric, is indicated by *v*, and is fastened to a bed-plate A, by means of a thumb-screw. The tucking gauge is indicated by *w*, and is used for measuring the width of the tuck, as the fabric passes under the needle.

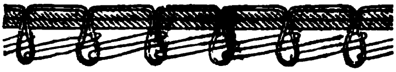


Figure 3.

Fig. 3 shows the character of the stitch when the threads are loose, by which it will be seen that the under thread, fed by the circular needle, G, is passed both through and around the loop of the upper thread, fed by *h*, in effect tying it twice.

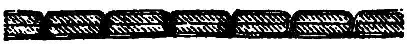


Figure 4.

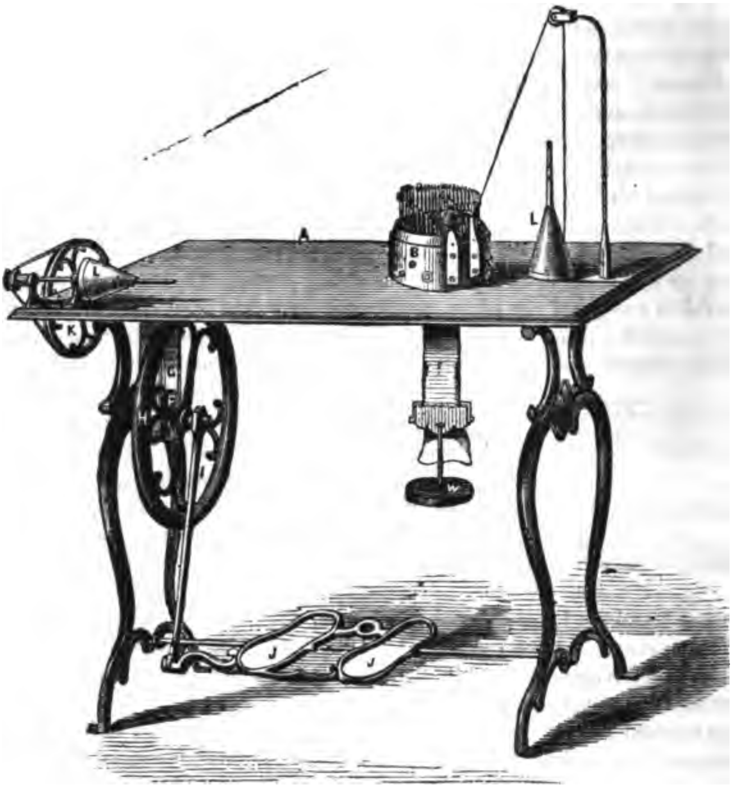
Fig. 4 shows the stitch after it is perfected, which the proprietors claim to be as strong, elastic, and durable as the fabric itself, and not liable to break in washing, wringing, or ironing. Even if the thread should break at every inch, still the seam would be durable, for the strength of seam is not dependent upon all the stitches remaining perfect, as each is separately fastened and independent of the other.

It is claimed that it will sew all kinds of fabrics, between and including gauze or lace, and beaver cloth, without changing either needle, tension, or threads, and that it will sew all equally well, without disarranging any of the machinery.

[*A large silver medal awarded.*

Goffe's Patent Knitting Machine, for family, plantation, and manufacturing purposes.

H. C. Lee, agent, No. 575 Broadway, N. Y.



The above is a perspective view, showing the complete machine. A is the table, and B is the working cylinder by which the needles are moved up and down, and which carries the *feed* and the *presser-roller*. L, bobbin, on which the yarn is wound from the hanks in order that it may pay-off easily to the feed. The wheel K, on the end of the shaft E, receives motion through the band G, pulleys FF, and link I, from the treadles JJ, the motion being rendered uniform by the fly-wheel H. When K is put in motion, the spindle upon which L, the bobbin, is placed, receives a rapid rotation, so that yarn can be wound rapidly upon it. The feed takes its yarn from the other bobbin, which stand on a vertical spindle, over a pulley, and feeds it to the needles, which are closed by the presser-roller following the feed and are drawn down by the cam action. A weight, W, is used to give proper tension to the work. This is secured by a self-closing clasp, upon the work, which, being a uniform weight, acts with uniform tension upon the web.

Price of family machines, complete, $50.00. Each machine is furnished with one winder for spooling yarn, which can be used while the machine is in operation; one pair flexible swifts; four spools; one soldering plate; one wrench; one working hook: twenty-four extra needles with steel jacks.

[*A large silver medal awarded.*

Johnson's Patent Adjustable Hanger.

Wm. Cowin, Lambertville, N. J.

The great desideratum, as every machinist knows, is to have a hanger which allows at once an easy and permanent adjustment of the box, in position, both laterally and vertically, and also an angular adjustment in direction, so that not only the centres of all the boxes or bearings shall be in the same right line, but that the axis of each shall coincide with that of each of the others.

This hanger, it is thought, accomplishes effectually all that is required, and does it in such a way as at once to secure the greatest possible degree of compactness, simplicity and strength. That such is the fact, will be manifest from a very slight description of the improvement:

H is the box, having two pairs of cylindrical surfaces, each pair being portions or segments of cylinders at right angles to each other, and to the axis of the box. B is the hanger, with four enlargements, forming bosses E, the inner end of which is cored out to admit four short blocks, while the outer end is drilled to receive the four screws F, by which the box is adjusted in position; the four blocks being cast with a curvature in one end, fitting that of the box, and which, when pressed up by the screws, secures the box firmly in position, at the same time allowing it to conform freely to the line of shaft.

Some of the most obvious advantages of this hanger, are the following:

1st. Its cost is scarcely, if at all, more than that of the ordinary hanger, all the fitting required being the four screws.

2d. It is equally and perfectly adapted to every kind of line shafting, whether in the form of brackets or pillow block bearings, and to the support and adjustment of single and disconnected shafts of machinery.

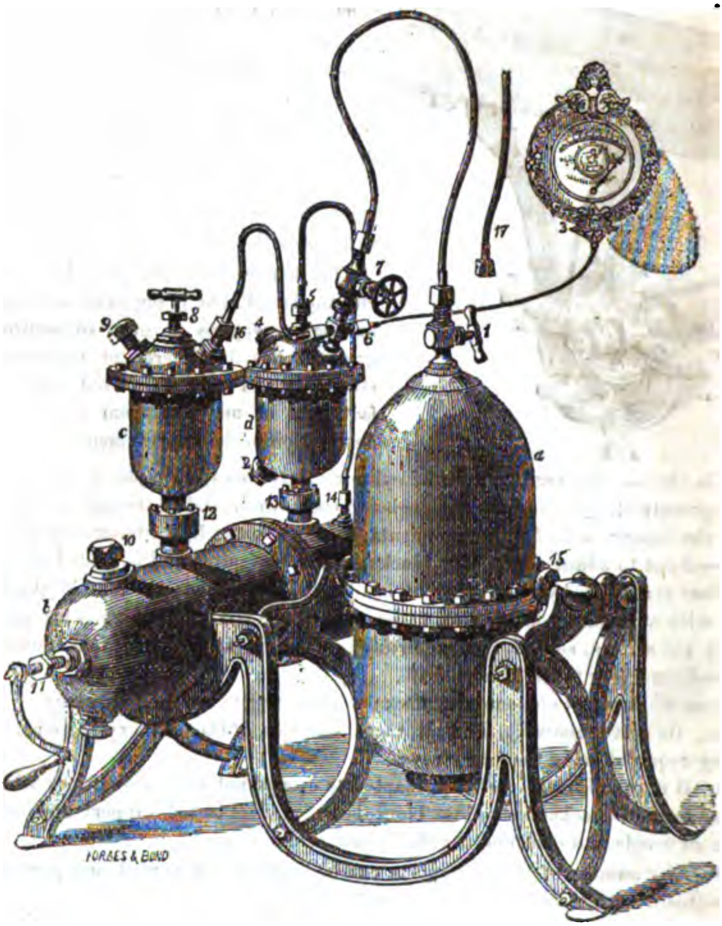
3d. Any number of these supports can be brought into perfect and permanent adjustment with the utmost facility and dispatch.

4th. The perfect freedom with which the box adjusts itself to the shaft is such as to equally distribute the friction throughout its entire length, under every vibratory movement of the shaft, thereby requiring the least possible quantity of oil, and preventing that unequal wearing and disfiguring of shafting, which adds greatly to its friction and impairs its durability.

5th. The strain or pressure upon the box being always precisely perpendicular to the point of resistance in every direction, and all the parts being exceedingly compact and simple, this hanger has the two-fold advantage of requiring less weight of metal, and securing a greater degree of strength and safety than any other device, thus challenging the attention of all who either manufacture or use line shafting, as well on the score of economy, as for its perfect adaptability to the purpose for which it is designed. [*A large silver medal awarded.*

Matthews' New Soda Water Apparatus, for Manufacturing Soda.

John Matthews, No. 437 and 439 First Avenue, New York.



This apparatus is both economical and simple and is used for manufacturing soda water, or aerating other liquids with carbonic acid.

In the construction of this apparatus especial care has been taken to insure the purest water, the greatest convenience and sufficient strength and capacity, for the use of the most economical materials. It is warranted by the manufacturer to sustain a pressure of 500 lbs to the square inch. It occupies a space of five by two feet.

Charge the fountain *a*, with ten gallons of pure cold water, then screw the brass cock in tightly.

Pour into the gas washer *d*, three pints of water at 4, and screw the brass plug in tightly.

Into the generator *b*, at 10, pour, first, one gallon of water, and then three quarts of ground marble; screw on the brass cap tightly, after carefully wiping all marble, &c., off the screws, then turn the agitator at 11, slowly, two or three times round. Close the valve in the vitriol chamber *c*, by forcing down with the hand the rod at 8; then pour into the chamber at 9, two pints of oil of vitriol, and after greasing the screw with a piece of tallow, screw the brass cap on tightly.

To make the gas, raise the valve in the vitriol chamber at 8, and watch the pressure gauge; as soon as it indicates 10 lbs. on the inch, close the valve, and turn the agitator on the generator, slowly, at 11; this will increase the pressure considerably, but if it does not rise to 100 lbs. on the inch in a few minutes, more vitriol must be let down by raising as before the valve rod at 8, and the agitator of the generator turned slowly as before. As soon as the pressure reaches 100 lbs., open the cock on the fountain by screwing the handle to the left as many times as may be necessary to bring it tight, for it is never tight unless screwed back as far as it will go, with the hand; the cock 7 on the washer may then be opened, to allow the gas to run into the fountain; this will diminish the pressure on the generator and washer, but it must be again raised to 100 lbs.; the pipe on the fountain must then be taken off, first closing the cock on the washer by screwing the wheel to the right, and then the cock on the fountain by turning the handle to the right with the hand, until it will turn no further; then take the pipe off the fountain, and agitate the water by swinging the fountain round, and by holding it in a horizontal position and shaking it for a few minutes. The fountains should then be again connected, and the cocks opened (care being taken to open first the cock on the fountain); the gas should pass very slowly into the fountain, and the pressure should stand at 100 lbs. for a few minutes. The pipe may then be taken off and the water in the fountain agitated as before; after which it may again be connected, and the cocks opened. If the pressure is not 100 pounds, it must be raised to that point by turning the handle of the generator slowly, and opening the valve on the vitriol chamber.

If the generator should leak at 11, or the vitriol chamber at 8, the nut on the rod should be screwed up until it ceases to leak. When, however, the leak cannot be stopped, or the nut is screwed up as far as it will go, the stuffing box requires repacking, (for doing which see directions.)

The charging pipe should now be taken off the fountain, and the pipe 17, from the draught tube attached, and after opening the cocks on the fountain and washer the soda water is ready for use. The remaining gas must be permitted to escape very slowly, by opening the cock 7 on the washer, a little. When it has all escaped, it may be known by the pressure gauge returning to zero. If the gas is drawn off too rapidly, the materials in the generator are liable to boil over and obstruct the pipes and washer.

The caps on the generator may now be unscrewed and the refuse materials emptied. The generator must be washed out well with clean water, and the cap 3 under it screwed on again, taking care to wash every screw free from marble dust.

The charge of water and marble may be then poured into the generator, ready for the next time.

The water in the washer must be renewed every time, by unscrewing the plug at 2, and after the water has run off, and the washer well rinsed with clean water, replace the plug 2 and charge with fresh water, and then screw on the plug 4.

The vitriol should not be poured into the chamber until the charge is wanted, nor should it be permitted to remain longer than necessary, and care should be taken before pouring in the vitriol, to close the valve in the vitriol chamber, which may be done by pushing down the rod on the vitriol chamber at 8.

Soda water is simply pure water impregnated with carbonic acid gas. Sometimes a minute portion of carbonate of soda, or Rochelle salts, is added to the water previous to charging it with the gas.

Good Soda Water is known by its agreeable pungent taste, by its slightly exhilarating qualities, and by its bubbling and scintillation. These properties are strikingly exhibited at a low temperature. It should leave no unpleasant taste, and should be entirely innocuous.

How is it made?—The water to be impregnated with the gas is placed in a strong vessel, usually made of iron or copper, called a fountain. The water should not occupy more than two-thirds the contents, as space enough must be left for sufficient gas to discharge all the water with a good pressure.

The gas used exists naturally in many substances: but, in great purity, in marble, which consists of nearly equal parts of lime and this gas in a solid state.

Sulphuric acid, having greater affinity for lime than the carbonic acid, instantly combines with the lime and the carbonic acid is liberated and copiously given off.

This gas may be forced by an air-pump into the fountain.

Or, if the gas is generated in a tight and strong vessel, a great pressure naturally results. The gas, after being passed through water to purify it, may be conducted to the fountain; and after sufficient agitation in contact with the gas at a high pressure, the water becomes impregnated, and is then what is known as soda water.

In a commercial point of view it is important that the apparatus used to generate the gas should be so constructed that materials easily accessible and cheap may be used, It is for want of this consideration that the failure of so many machines using carbonate of soda and other expensive chemicals may be attributed as, although the apparatus may be bought at a low cost, it can never compete with the more perfect machines which are equally well adapted to all materials.

HISTORY OF AERATED WATERS.

The first experiments were made by Venel, in France, in 1750, and published in 1775; by Priestly, 1768; later by Bergmann, Black, Van Helmont and others. In 1780, appeared the work of Dr. Duchanoy, at Paris, "Essays on the art of imitating mineral waters." The first manufactory in the world was established at Geneva by an apothecary of that city, named Gosse, whose annual sales amounted to 40,000 bottles "Eau de Seltz." In 1798, his partner, Mr. Paul, founded an establishment in Paris, where were compounded not only the principal mineral waters of France, but even those of foreign countries. From this time onward, laboratories multiplied all over Europe,* and the manufacture of simple aerated water is now carried on, on so large a scale, in all civilized countries, that a very remarkable amount of inventive talent has been successfully employed in improving the necessary apparatus, until it may be said that there is nothing more left to desire.

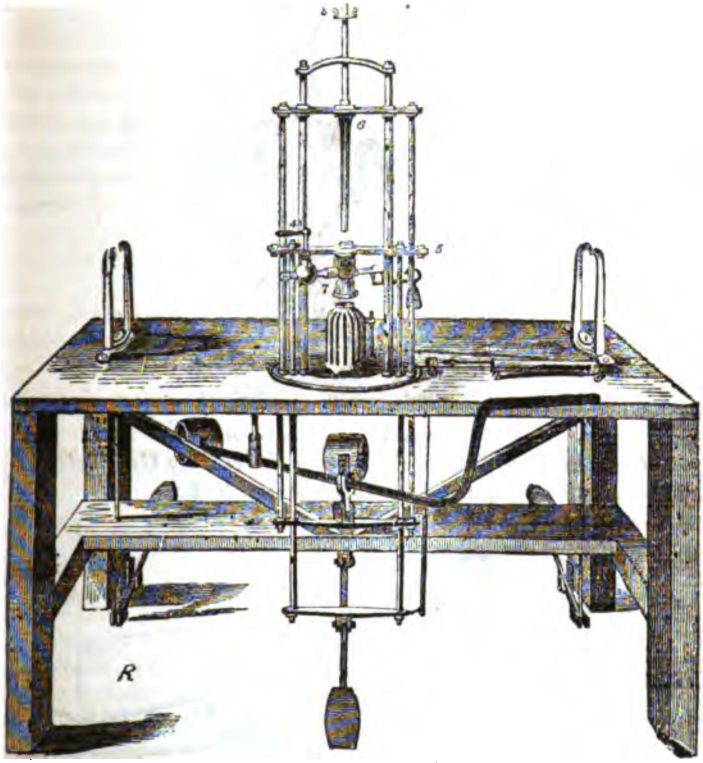
From accurate observations made in the principal capitals of Europe, it is computed that the quantity of aerated water consumed as a beverage in the United States, greatly exceeds that in all Europe. It was demonstrated five years ago, that the occasional amount drank in New York, during the warm weather, was more than one million of bottles per day, independent of the draught consumption.

[*A Silver Medal having been before awarded, Diploma.*

* The more important medicinal mineral waters are also manufactured on a large scale by Dr. Hanbury Smith, at his well-known "Spas" in New York and Cincinnati.

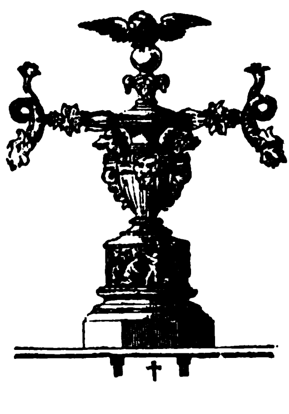
Matthews' Soda Water Apparatus.

John Matthews, 437 First avenue, N. Y.



Matthews Bottling Machines.

Fig. X



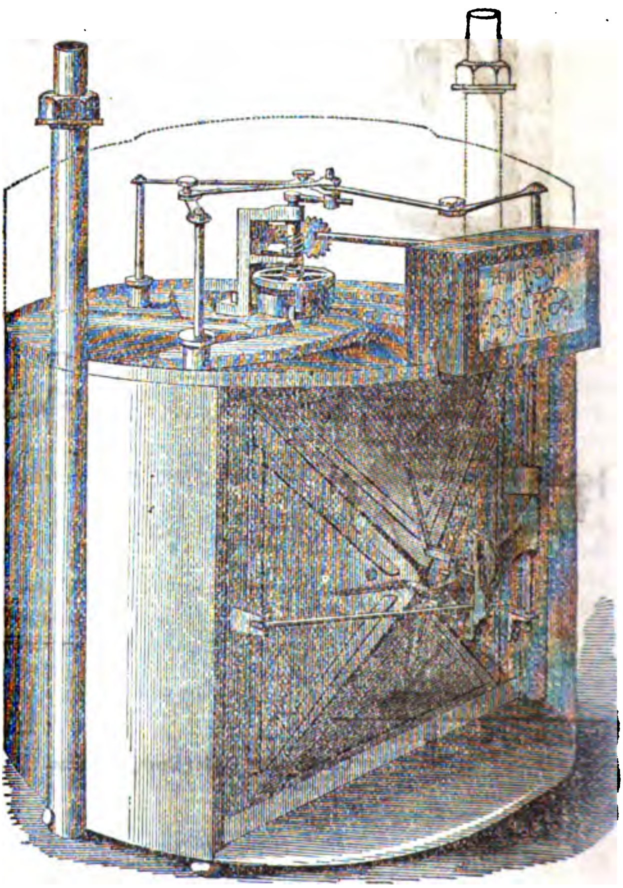
Combination Cooler Draught Tubes.

Drought Tube for Soda Water.

Code, Hopper & Gratz's Rotary Valve Dry Gas Metre.

Wm. L. Shoener & Co., agents, 135 William street, N. Y.

The frequent variation of registry in the dry gas metre, it is well known, is occasioned by the lifting of the valve from the valve seat, caused by the accumulation of solid matter on the valve cover or seat, and this solid matter or deposit from the gas is constantly carried along the same path, without being removed. This is overcome by the adoption of a rotating valve, constructed with its surface broken by sharp edges at each and every circumference, whereby the deposit is removed, thus keeping the valve surfaces clean, and preventing the valve from leaking.



Rotary Valve Dry Gas Metre.

The plan adopted in communicating the rotary motion to the valve cover, in a direct plane, by means of an independent carriage, keeps the valve always in its proper position, thereby overcoming the objection heretofore encountered by attaching the valve directly to the upright shaft. The valve surface being smaller in this metre than in any other, the friction is less, and the liability of the valve and valve seat to adhere, when the metre is for a time inactive, is entirely removed. Attached to this metre are three drip pipes, leading from every part, by which means the metre is kept free from all accumulation of liquid deposits, which would freeze and otherwise interfere with the correct registering and durability of the instrument.

REPORT OF THE JUDGES ON STEAM ENGINES AT THE THIRTY-FIRST ANNUAL FAIR OF THE AMERICAN INSTITUTE.

The undersigned, who were appointed judges upon steam engines, respectfully report: That they have examined all the engines submitted to them, and given due consideration to the written communications and verbal statements of the exhibiters and their agents. Their conclusions in regard to the merits of the several engines exhibited are as follows:

Of the three portable engines, Nos. 400, [Fishkill Landing Machine Co.;] 585, [Payne & Olcott;] and 1056, [John C. Hoadley,] embracing all the engines in which the engine, boiler, pump and other accessories are embodied in one complete machine, they award the first rank to the engine built and exhibited by J. C. Hoadley, of Lawrence, Mass.; the second to the engine No. 400, built by the Fishkill Landing Machine Works; and the third to the engine built by Payne & Olcott, Corning, N. Y.

The points upon which this decision is based, are judicious proportions of boiler, strength of boiler, arrangement of engine and general details, materials used in construction of engine; workmanship; provision against wear, under the treatment to which engines of this class are ordinarily exposed; arrangement of pumps, valves, and feed pipes; and provision for heating feed water, total weight and cost.

Three stationary engines, Nos. 1052, (G. H. Reynolds;) 333, (Todd & Rafferty;) and 509, (C. A. Schultz,) are exhibted, in which the leading feature is the cut-off, or expansive gear,—and to this part of each engine the attention of the judges has been mainly directed. They have weighed especially the merits of each system or arrangement of ports for opening and closing the valves of steam engines, and adjusting the time of closing to variations of resistance and boiler pressure, *when acting in connection with, and under control of the governor*. And, while they have recognized certain points of superiority in Nos. 333 and 509, they give the first place to No. 1052, designed by George H. Reynolds, and built by the Novelty Works. They have, as they believe, fully admitted and appreciated the objection which is urged against placing any part of the appliances of cut-off gear within the steam chest cover. They also believe that such a disposition of these parts will continue as heretofore to prove fatal to all contrivances which do not perform their functions without material frictional resistance or wear. They have satisfied themselves, however, that the engine of Mr. Reynolds is so nearly free from this source of derangement as to be quite exceptional. Considering the fact that *any* modification of cut-off gear which is made variable and controllable by the governor must, of necessity, be more complex and precarious than the less refined mechanism of ordinary valve movements, they believe the method of Mr. Reynolds, as carried out in this engine, *taken as a whole*, to be quite as reliable as any system of adjustable cut-off gear hitherto proposed or now in use. With a high degree of simplicity, as regards fewness of parts and cheapness of construction, they find the following results practically realized:

Rapid closing of the valve without wire-drawing, unattended with injurious shocks of offensive noise.

Closing instantaneous in all positions, without regard to the position or rate of motion of the induction valve.

Time of closing adjustable to any point between the beginning and the middle of the stroke of the piston.

Ready obedience to the adjusting movements of the governor, opposing so little resistance to the action of the governor that its plan of rotation, and the resulting velocity of the engine, are not sensibly affected.

The engine exhibited by the *Novelty Works*, in connection with Mr. Reynolds' improvements, is entitled to the commendation of the judges, and the consideration of the committee, on account of its extreme simplicity and economy of construction, judicious arrangement of beaming cylinder, and pillow block, and general excellence in essential points.

The judges award the second place to the engine No. 333, built by Messrs. Todd & Rafferty, of Paterson, N. J., and fitted with the adjustable cut-off gear of Messrs. Uhry & Lutgen. This modification of the Stephenson link motion, although not wholly free from the disputes of wire drawing, prejudicial closing of the exhaust passages, and limited range in time of closing, has, nevertheless, so far removed them by the introduction of a third movement, derived from a cam, that it appears well adapted to all classes of engines, and especially adapted to engines working at high velocities. As applied to locomotives, for which it was originally designed, the judges, guided by the testimonials which have been placed before them, believe it to possess great and peculiar merits, and in this respect to take precedence, not only of the other plans of cut-off gear now on exhibition, but also of any other with which they are acquainted.

The third place is assigned to the engine No. 500, exhibited by Mr. C. A. Shultz, New York. The judges find that the system of opening and closing valves, by means of a double series of cams, one fixed and the other adjustable, presents certain advantages (particularly in its treatment of the exhaust passages), which will no doubt be more apparent when the plans of the inventor, with his contemplated improvements, shall have been further matured and developed.

No. 754, excentric revolving engine, exhibited by S. A. Heath & Co. The judges perceive many evils, and no advantage whatever, resulting from this inversion of the ordinary parts of a steam engine.

No. 166, rotary steam engine, exhibited by Samuel Ackerman, New York. It is so long since the judges had their attention directed to an engine of this class (which, although formerly indigenous to the annual exhibitions of the Institute, has become almost an exotic,) that they bestowed unusual patience upon the setting forth of its peculiarities. They failed, however, to discern any redeeming feature which will be likely to raise it above the level to which universal experience and opinion have consigned all rotary engines.

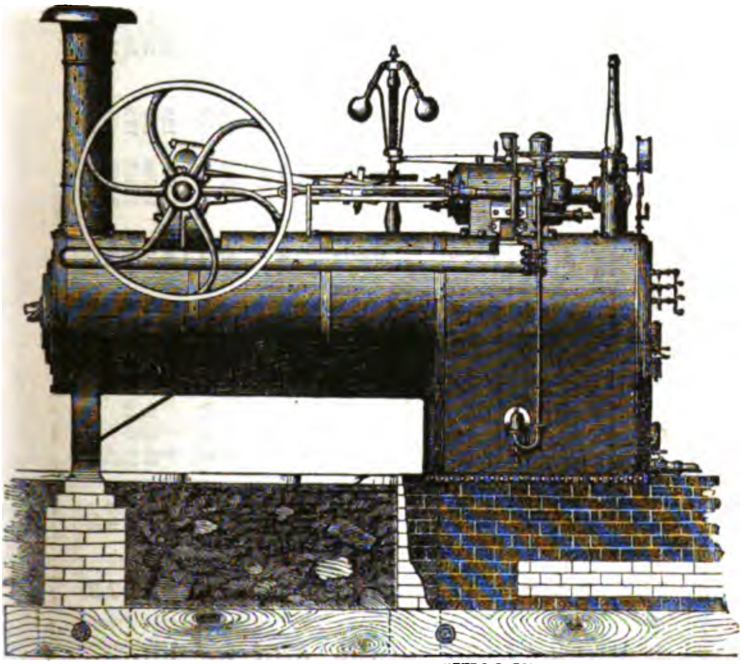
No. 468, model of a beam engine, exhibited by C. H. Raymond and E. P. Watson—a moderately good specimen of work.

No. 334, horizontal steam engine, exhibited by Todd & Rafferty, Paterson, N. J. A good example of a modern horizontal engine; workmanship first rate; no claim to novelty.

C. H. DELAMATER,
JOSEPH NASON,
JOHN B. JERVIS, } *Judges.*

Hoadley's Portable Steam Engines.

J. C. Hoadley, Lawrence, Mass.



These engines are very compact and complete, having a feed-water heater, force pump, regulator, belt pulley, turned on the face, steam gauge; in short, every thing necessary to set them in operation, on the introduction of water and fuel (either wood or coal) to the boiler, and applying a belt. No smoke-pipe is furnished with them, as it is bulky, liable to injury if sent unboxed, and expensive to box up. Eight, ten, or twelve inch stove-pipe, of heavy English sheet iron, is all that is required, and that is to be had anywhere, in any length the location demands.

The boilers are of best American iron, strong, well made, and supplied with fusible safety-plug, and warranted to bear a cold water test pressure of 200 lbs. per square inch, and a constant working pressure of 120 lbs. They embrace the principles of the best modern locomotives, are well made, without finish for show, and are capable of working much above the power inserted in table.

A good strong running gear, arranged so as to be easily attached and detached at pleasure, will be supplied at from $125 to $225 extra, forming a useful wagon when separate.

No.	Form.	Cylinder. Diam. In.	Cylinder. St'ke. In.	Boiler. Waist. Diam. In.	Boiler. Fire-Box. H'ght In. / L.	Boiler. Fire-Box. W.	Boiler. Fire-Box. Diam. In. / H.	Boiler. Tubes. No.	Boiler. Tubes. Diam. In.	Boiler. Tubes. L'gth. In.	Boiler. Fire Surface. Sq. feet.	Boiler. Grate Surface. Sq. feet.	Balance Wheel or Driving Pulley. Diam. In.	Balance Wheel or Driving Pulley. Width of Face. In.	Balance Wheel or Driving Pulley. Weight. Lbs.	Balance Wheel or Driving Pulley. Speed. Rev. per minute.	Power. H. P.	Weight. Pounds.	Price. Cash.
1	Vertical.	3	9	22	66		16	....	......	......	22	1 4-10	26	6	239	175	2	2,200	$300 00
2	do	3	9	22	30		16	19	2¼	36	40	1 4-10	26	6	239	175	2	2,350	365 00
3	do	3½	9	22	36		16	19	2¼	36	47	1 4-10	26	8	275	175	2½	2,500	385 00
4	Horizontal	4	10	24	30	20	18	14	2¼	48	44	4 1-6	48	7	324	150	3	2,700	425 00
5	do	4½	10	24	33	20	18	16	2¼	48	50	4½	48	7	224	150	4	2,900	450 00
6	do	5	10	24	36	20	18	20	2¼	48	60	5	48	7	324	150	5	3,200	475 00
7	do	5½	10	26	30	22	28	27	2¼	48	90	4½	42	7	431	175	6	3,700	575 00
8	do	6	10	26	33	22	28	29	2¼	48	97	5	42	8	460	175	7	3,900	600 00
9	do	7	10	26	36	22	28	29	2¼	48	100	5½	42	9	500	175	8	4,500	675 00
10	do	8	12	29	39	25	33	34	2¼	60	139	6¾	42 and 48	12*	920	175	12	5,800	840 00
11	do	9	12	29	42	25	33	41	2¼	60	161	7 6-10	42 and 48	12*	1,000	175	15	6,500	950 00
12	do	10	18	36	42	31	41	53	2¼	86	286	9	72 and 48	14*	1,600	125	20	10,300	1,300 00
13	do	11	18	36	48	31	44	60	2¼	84	308	10 3-10	72 and 48	14*	1,600	125	25	11,500	1,400 00
14	do	12	18	36	54	31	47	65	2¼	90	357	11 6-10	72	14*	2,362	125	30	13,000	1,550 00
15	do	14	18	40	54	35	48	80	2¼	90	432	13	84	16*	2,362	125	35	15,000	2,000 00
16	do	16	18	40	60	35	48	90	2¼	96	510	14 6-10	96	18*	2,362	125	40	17,000	2,300 00

* Nos. 10, 11, 12, 13, 14, 15, and 16, have two balance wheels each.

REPORT OF COMMITTEE ON FIRE ENGINE MANHATTAN.

The special committee, appointed to examine the steam fire engine Manhattan, now on exhibition at the Thirty-first Annual Fair of the American Institute, respectfully report:

That the said engine originated from the desire of fire company No. 8, of this city, to avail themselves of the known capacities of the steam fire engines, as hitherto constructed, but at the same time to have a machine which should be as readily moved and worked as the ordinary first class hand engines. The Manhattan embodies, in an especial manner, as your committee think, the requisites for the service required, viz., lightness, as compared with that of hand engines capable of throwing a stream to an equal distance; the ability to be run rapidly over the irregular pavements of our streets, without deranging the working parts, and by a company of men not greater than is usually attached to a first class hand engine, together with the ability to generate steam enough to maintain the stroke through any desired length of time. To attain these points, many of the arrangements recognized as absolutely necessary for the successful and economical working of a stationary pumping engine have to be sacrificed, and indeed others adopted, which, at the first glance, appear to be inconsistent with correct principles in mechanics. The present engine was built after the plans and designs of Messrs. Lee & Larned, of this city, who are already known as the builders of some of the most successful of the self-propelling steam fire engines. It has a vertical boiler of the kind known as "annular," a horizontal reciprocating steam cylinder of nine inches bore and eight and a half stroke, without cut-off, which drives a "Cary's rotary pump," having a fly-wheel of small diameter but heavy rim to ensure the passing of the centers. The builders claim that by this arrangement they are enabled to reduce very considerably the weight required in the use of a reciprocating pump, as well as to dispense with all pump valves, while the packing of the rotary is as easily kept in order as that of a reciprocating piston. Theoretically, the air vessel may also be dispensed with, but a small one is employed, which perhaps steadies the stream a little. At a trial of this engine, on the 28th instant, in presence of your committee, steam was raised to ten pounds per square inch in eight and a half minutes after the fire was lighted, and the engine was then started to play through a one inch nozzle. In ten minutes more, the steam had run up to 140 lbs., and the engine was making 296 revolutions per minute, the stream reaching to the distance horizontally of 261 feet from the pipe. This was kept up as long as was desired by your committee, satisfying them fully of its ability to maintain the same, if requisite, for hours at a time.

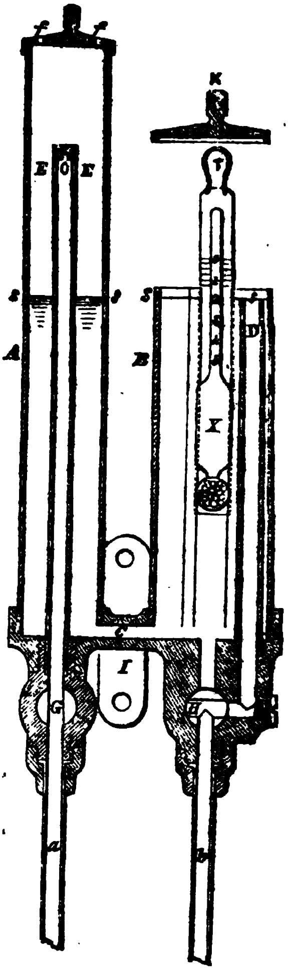
The committee express confidently the opinion that this engine exhibits the best application of steam power to the extinguishing of fires in cities, which has yet been made. It is certainly a very ornamental addition to the fire department of New York, in which it has been successfully used for six months past, and your committee consider that its designers are eminently deserving of the commendation of the American Institute for their taste, ingenuity, and skill.

Dated New York, *October* 29, 1859.

SAMUEL H. MAYNARD,
W. B. LEONARD, } *Judges.*
JAMES RENWICK,

Long's Improved Marine Salinometer Case, for Steam Boilers.

Joseph Grice, 96 Wall street, N. Y.



This improvement consists in attaching the cylinder A to the cylinder B, having a communication C, as a means of safety to the hydrometer, perfect accuracy in testing the density of water, and insuring the engineer against danger from scalding, &c.

EXPLANATION.

The cylinder or other shaped vessel A is connected with the boiler by the pipe and stop-cock G, the pipe G being closed at the top and having openings on the side, near the top, E E.

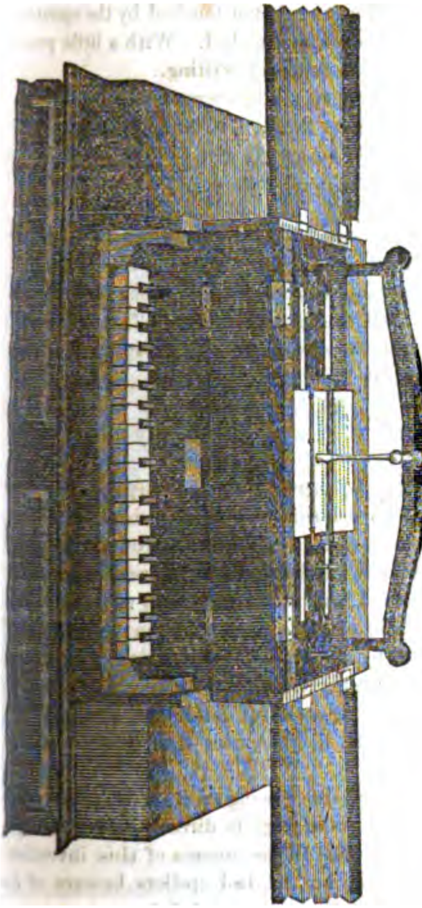
The water coming from the boiler and passing the stop-cock G, makes its exit through the openings, E E; at this point the steam is liberated from the water, and escapes through the openings, *f f*. The water falls into the cylinder A, passes through the opening C, and rises to the water level, *s s s s*, in both cylinders; D is an overflow pipe to carry off the surplus water, and to keep up a sufficient current to maintain the water to be tested, at the required temperature. By turning the stop-cock H, both cylinders can be discharged. T is a thermometer, fitting in a slide. X is the hydrometer. K is the cover for closing the case when not in use. I is a bracket for securing the instrument to the boiler, bulkhead, or other suitable place.

This instrument affords a ready means of drawing water from a steam boiler, under any pressure and temperature, without ebullition in the cylinder B, or oscillation to the hydrometer.

[*A bronze medal awarded.*

Francis' Writing Printing Machine.

S. W. Francis, 1 Bond street, N. Y.



This printing machine is intended to be used by such persons as may want to preserve legible copies of their writings or ideas, and is specially adapted for the use of clergymen, editors, merchants, and literary men. It is operated by piano keys, each of which carries a letter, and by pressing on the key, two impressions of that letter are made in less time than it would take to write one.

Fig. 1 is a top or plan view of this machine, B being one of the sides, and F (and C, fig. 2) are crossbars, binding the sides together. The types are attached to hammers arranged round a circle so as to strike up against the stud, *k*, at a common centre. The paper is placed in a car, J′, *d′ e′ g′*, between the rollers, *k*, and *i′*. The ink-band, *p*, moves on four rollers similar to *l*, passing between the two sheets of paper. The transmission of power is by means of wires, such as *s s′ s″*, V V′ V″, working on bell cranks, T T′ T″; each key, K K′ K″, is connected with one of these wires. A spring is attached by a string, S′, to the car by means of the hook V′. This car is kept back by the cord, *a′*, around a barrel *b″*, which is furnished with a disk, on which are pegs, checked by the escapement, *d′*, working on the lever, *f″*, and connected with the bar, *g′ h″*, common to the tops of all the keys (*o″*, fig. 2). When the car is brought back on the rails, *b′* and *c*, to begin a new line, the handle, *q″*, is pulled, and

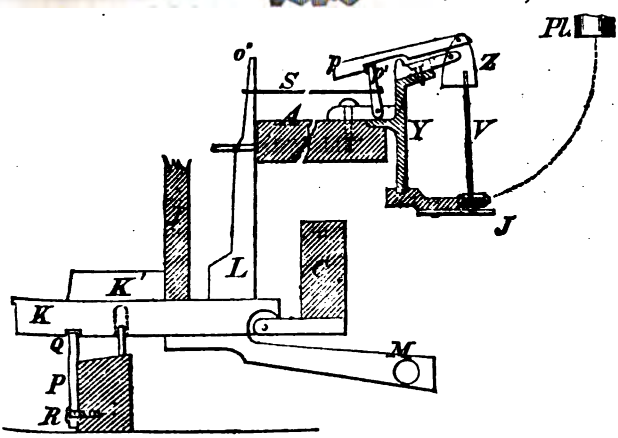


Figure 2.

the spider wheel, v″, coming against the lever, S″, is turned two lines. When within four letters of the end of a line, a little bell rings to give warning in time for the word to be divided by a hyphen. The paper is not touched by the operator till the page, which is constantly before his eyes, is finished. With a little practice, one can print fifty per cent faster than the ordinary writing.

Fig. 2 is a sectional view of one key working on a hinge screwed to the crossbar C, and having a counterweight, M. Pressing on the key, K or K′, that part of L at o″ pulls the wire S, which moves the rocker p′, carrying with it the pawl p, the hammer Z V, screwed on the circle Y, set into the frame A, strikes up against the common centre, Pl, which is the stud k, fig. 1.

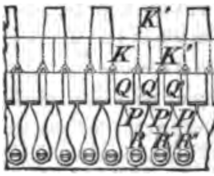


Figure 3.

Fig. 3 is a front view of the top-bolts under the keys, to prevent more than one going down at the same time. This is necessary on account of there being but a common centre for all the types to strike. The stop-bolts, P P′ P′, work on the screws, R R′ R″, having their tops beveled so as to fit in between the keys, K K′ K″, etc. When a key is depressed, the stop-bolts are driven to the right and left of it, and consequently under *all* the other keys.

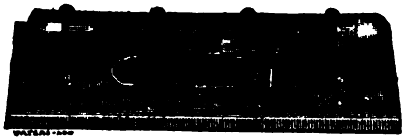
The letters can be formed of any sized type, engraved for the purpose, and suiting the taste of the purchaser. Those who use this "Writing Printer" will be enabled to strike off two copies in less time than is required to produce one with the pen. Divines, while in the pulpit, will be freed from the inconvenience attending an ordinary manuscript; authors secured from losing the result of many hours of mental application, by the destruction of a single copy while in the hands of the publisher; editors no longer troubled by the necessary correction of errors in proof-sheets, incident to manuscript copies; reporters may, with less labor, furnish printed reports; and merchants, while writing a clearer letter and saving time, may keep neatly-printed copies, instead of the illegible ones they now obtain by means of the copying-press.

The price is $100. The position of the "writer" being erect, is eminently conducive to gracefulness and health, and the whole page is directly under his eye. Literary men cannot fail to take a deep interest in the success of this invention. With it, a bad chirography may be concealed, but let bad spellers beware of its fascination.

[*A diploma awarded.*

Smith's Magnetic Machine.

Samuel B. Smith, 322 Canal street, N. Y.



This instrument is used by the dental profession in extracting teeth. It has a *direct* current, as well as a to-and-fro current, and the zincs never require cleaning. The expense of running it is said to be about one cent a week.

[*A diploma awarded.*

Backus' Patent Combination Stove and Range.

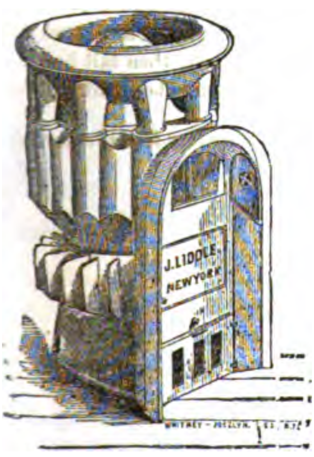
E. Backus, 233 Water street, N. Y.

This stove and range is intended for roasting, baking, broiling, and boiling, at the same time.

The main oven, for baking bread, has a circulation of hot air through it, which carries off the evaporation and moisture. The broiling oven is made with a proper arrangement for broiling over anthracite coal, without removing the vessels from the top, and without filling the house with smoke. The roasting oven is provided with air passages and with a spit, by which meats can be roasted as well as in a Dutch oven. [*A silver medal awarded.*

Liddle's Patent Gas-tight Furnace.

Robert Z. Liddle, 235 Water street, N. Y.



The inventor claims for this furnace:

1st. That it has the most radiating surface, for the size of the fire chamber.

2d. That it gives the greatest amount of warm air, for the quantity of fuel consumed.

3d. That the air is soft and pleasant, there being no red heat produced in the castings.

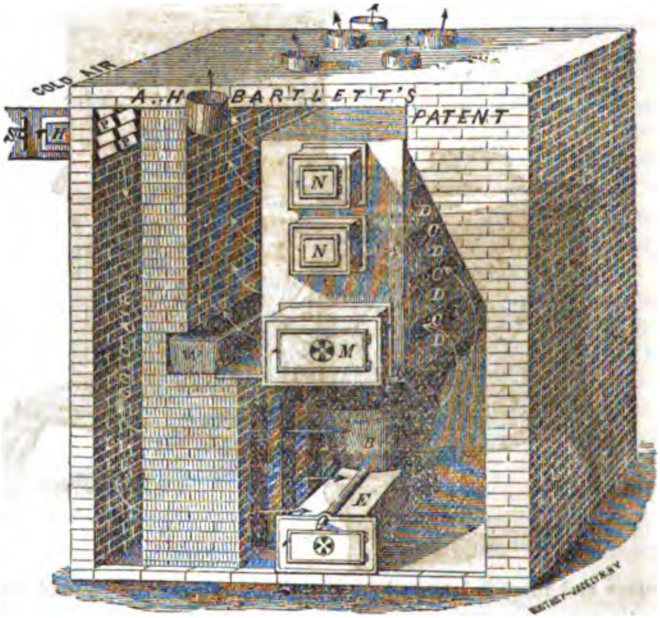
4th. That it is perfectly free from gas, smoke, and dust, there being comparatively no joints.

5th. That it is simple to manage, there being no dampers to confuse servants.

[*A bronze medal awarded.*

Bartlett's Patent Hot-air Furnace.

Bartlett & Lesley, 426 Broadway, N. Y.

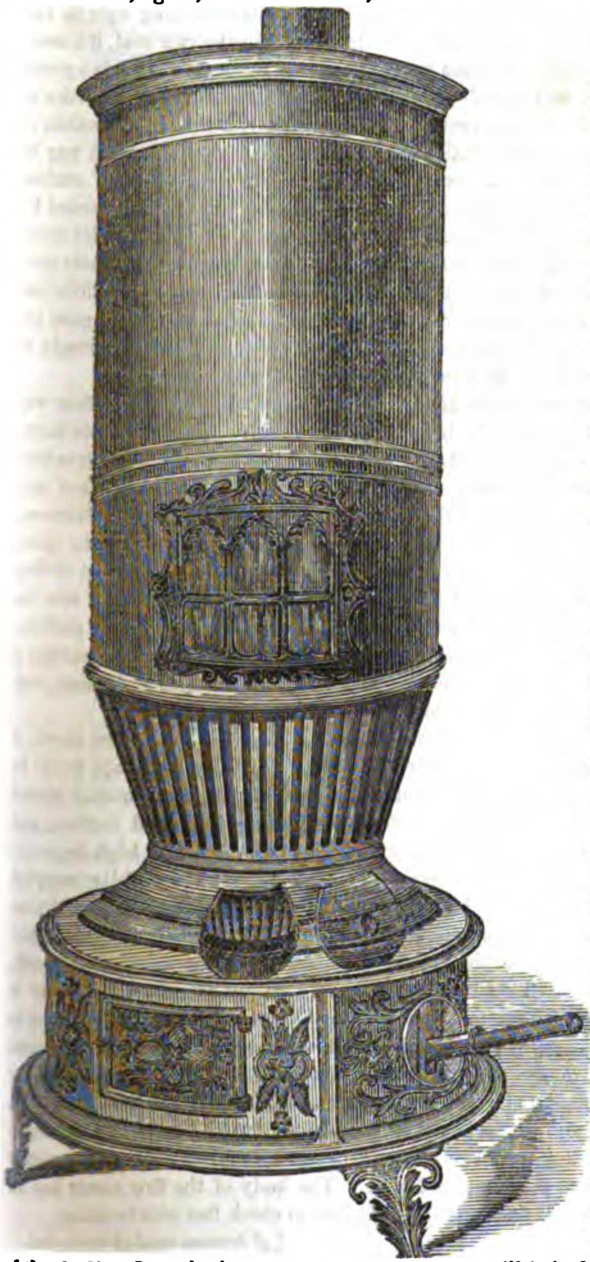


The drawing is a perspective view of this furnace, set with a fire arch, B, for burning coal—the brick-work in front being removed to show the construction of the hot-air chambers, and the direction the air travels. M, feeder door. N N, doors for cleaning the flues. K, damper, which should always be closed immediately after the fire is kindled. W, water-tank; the door should be bricked in, in front, for inserting it. S, damper in the cold air box, made so as to close when the winds are adverse; and H is a door to open, to admit the air when the damper S is closed. The inside walls should be smoothly plastered, and care should be taken that no mortar falls to clog up the flues or air spaces. The air travels as indicated by arrows. The space left between the brick-work and the sides of the furnace should be 14 inches for No. 6, 16 inches for No. 7, 18 inches for Nos. 8 and 9, and 20 inches for No. 10, and 24 inches for No. 11. The front and back wall should lap on to the corners of the furnace about half an inch, then fall back four inches, leaving this space for the air to pass up, so as to secure the front and back radiation.

[*A silver medal awarded.*

Delano's Improved Method of Burning Coal.

M. J. Frisbie, agent, 248 Pearl street, N. Y.



The leading peculiarity of Delano's method of burning coal, as illustrated by a stove on exhibition, and by drawing accompanying this description, is in the mode by which the coal is supplied to the fire, which is from *beneath*, against the fire, through the *bottom* of the grate. The mode by which this is effected, is as follows: Attached to the grate is a feeding box, round or square, with a movable bottom, which, when raised to the top of the box, is on a level with the upper surface of the grate. When it becomes necessary to add more fuel, the box is filled, and is carried, by a swivel, directly under the fire, the grate sliding back as the box advances. When the box is directly under the fire, the ignited coal rests upon the fresh coal in it. The bottom of the box is then thrown up by means of a lever, and the charge carried directly into the stove, or fire chamber; the bottom of the feeding-box, in its turn, serves as a grate, till it is drawn forward again, followed by the grate proper, on the same level. When the grate is again in its place, the bottom of the feed-box falls, and the box is again in readiness for another charge.

The first thing gained by this mode of feeding, is the combustion of the gaseous matter which all coals contain, which we will assume to be twenty per cent of their heating or evaporating power. To burn these gases, great heat, and a free supply of oxygen are necessary. In the ordinary mode of feeding upon the *top*, these conditions can only partially concur. In supplying the raw coal, it is necessarily thrown with considerable force upon the ignited mass, packing it to a greater or less extent, thereby cutting off the free supply of air. Just in proportion as this is shut off, is combustion imperfect. In supplying raw coal in any manner to a fire, the first process is a distillation of its gases. The carbon, which may be said to form the basis of the coal, cannot be brought into a high state of combustion till these are completely expelled. The fact may be familiarly illustrated by reference to the experience of any person who uses a furnace in warming his house. On the supply of new coal, a free draft must be allowed through the smoke-pipe, or the inmates will almost instantly be choked with coal gas. Very little heat results, or in other words, only partial combustion takes place till the gases are expelled. This is not thoroughly accomplished till the whole mass is brought to a white heat. The draft may be then shut or checked with impunity.

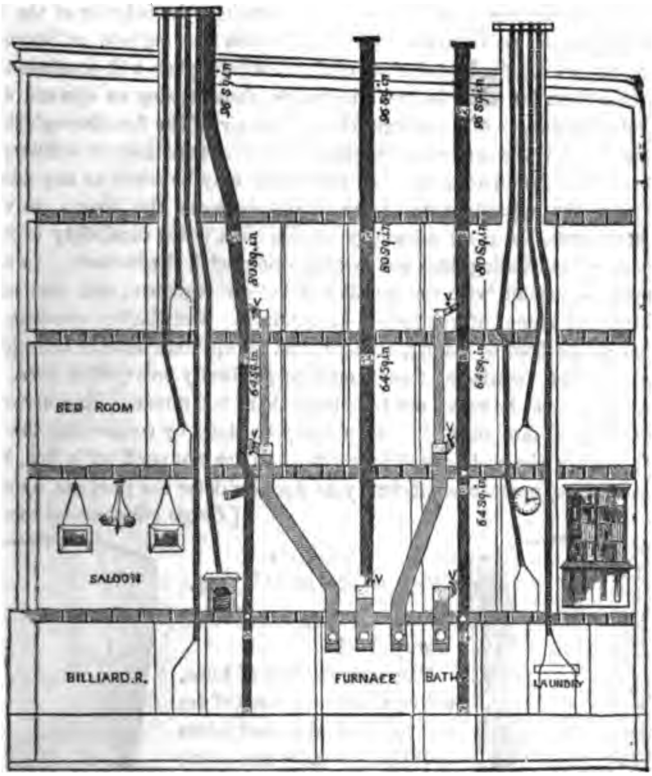
The gases thrown off, and which are so offensive when allowed to find their way into the house, are well known to be highly combustible. Could they be burnt, or, to state the process in a different manner, could they be decomposed into their constituents, and allowed to form new combinations, they would be not only innocuous, but the whole power of the coal would be utilized. This statement, however, does not express the entire loss from the *non*-consumption of the gases. The process of distillation or evaporization is well known to be the most cooling in nature, as any one can readily demonstrate by dropping a little ether into his open hand. The first duty the fire beneath the raw coal is called upon to perform, is to distil it. The next, to expel the product in vapor. These duties consume a certain portion of the effective power of coal fed in the ordinary manner, and diverts so much from the object to which it is directed.

Now it is alleged that this waste might, to a considerable extent, be saved, if coal could be supplied to a fire from *beneath*. By this process, the grate would be kept clean, and allow the free passage of air. The gases evolved would ascend with the air, through the super-incumbent mass of intensely ignited carbon, and the conditions requisite to the perfect combustion of the gases—a high degree of heat and an abundant supply of oxygen—would meet. They are fully supplied by Mr. Delano's improvement, as a slight inspection of its working demonstrates. Assuming, therefore, that he does accomplish the result claimed, a result better by 20 or 30 per cent than the ordinary one of feeding *upon*, instead of *underneath*, the burning mass, is secured. In the old process, constant attention and labor is required to keep the grate bars and fire sufficiently clean to allow combustion to proceed at all. In puddling furnaces and in steamships, the fire has to be drawn every given number of hours, for the purpose of removing the cinders and earthy matter that have accumulated. All the incombustible matter the coal contains, settles upon the grate, and unless removed, would soon form a compact and impervious bed. But by feeding from beneath, all this foreign matter very soon ascends to the surface of the fire, whence it is drawn. The body of the fire never has an amount of cinder or ashes mixed with it, sufficient to check free combustion.

[*A bronze medal awarded.*

Griscom's Improved Method of House Ventilation.

John H. Griscom, New York.



The cut shows the elevation of the west wall of the residence of E. V. Houghwout, Esq., Gramercy Park (21st street), New York, showing the position and connections of the heating and ventilating flues, illustrating Dr. Griscom's method of ventilation.

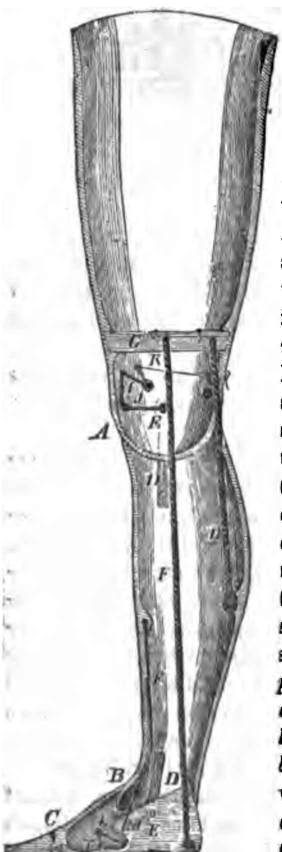
The light tinted tubes are the warm air, and the dark tinted are the ventilating flues. The short connections between them, at the hot-air registers, are each commanded by a valve, V.

This method of ventilation is applicable to all houses which are warmed by means of hot-air furnaces of any description. The arrangement consists in the construction of independent ventilating flues in the walls of the house, in proximity to the hot-air tubes, so that the two may be connected together by means of a lateral or branch tubes, each containing a valve, V, by which a current of hot air may at any time be transmitted from the hot-air tube to the ventilating flue. By this means the ventilating flue (which terminates in the open air, like an ordinary chimney) may be warmed by the hot air from the furnace, when the ordinary hot-air register is closed, as at night in a dwelling, or in a school house after school hours. The waste heat only of the furnace need be used for this purpose, as when once well warmed, the interior of a ventilating flue will retain an elevated temperature a greater or less length of time after the current of hot air is withdrawn.

The ventilating flues should be constructed of brick or smooth stone, without parging, so that the sides may be most readily warmed, and most easily impart their heat to the air within. Thus constructed, if a hot-air register of a parlor, for instance, be closed at ten o'clock at night, and the heat, instead of being thrown back into the furnace, is allowed to pass through the lateral tube into the ventilating flue, and so continue until six the next morning, the interior of the flue will become well heated, so that the next day, when the current of warm air is restored to the parlor, the heated sides of the ventilating flue will continue to rarify the air within them for many hours afterwards, thus causing an upward draught.

There being no danger of a regurgitation of the air of the flue through the ventilating register (as is the case when ventilating openings are made in ordinary flues), connections with the apartment to be ventilated may be made at any point, and even carried to the opposite side of the house, between the beams, to ventilate distant apartments. A great advantage of this plan is the capability of having a large number of ventilating flues put in connection with the furnace. In fact, the number may correspond with the number of hot-air registers, and thus any desirable amount and extent of ventilation be obtained. Ventilating openings may be made either at the floor or ceiling, or both, and all openings should be commanded by a register. The ventilating flues should be gradually enlarged in area, as they ascend, but care must be taken not to enlarge them too much. This arrangement may be introduced into many houses already erected, by connecting the hot-air tubes with such of the ordinary chimney flues as are not used with fire, but they will not, of course, operate so efficiently as flues built for the purpose, as directed.

[*Large silver medal awarded.*



Internal view.

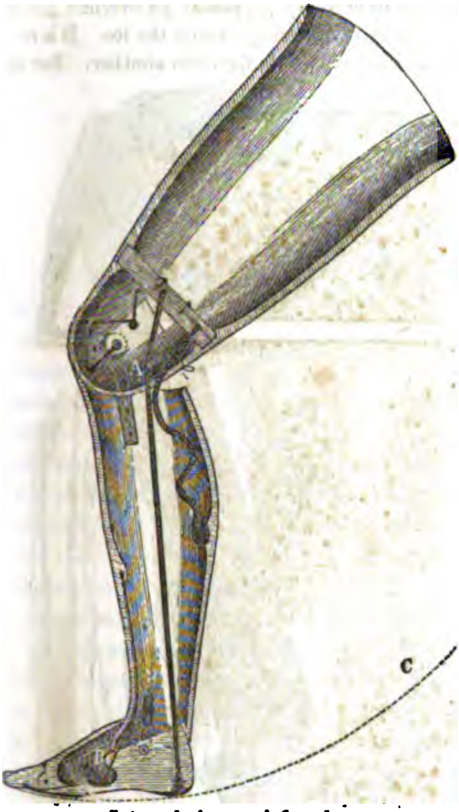
Palmer's
Patent Artificial Leg.

Palmer & Co., 378 Broadway, N. Y.

The articulations of knee, ankle, and toes, consist of detached ball-and-socket joints A B C. The knee and ankle are articulated by means of the steel bolts E E, combining with *plates of steel firmly riveted to the sides* of the leg D D. To these side plates are immovably fastened the steel bolts E E. The bolts take bearings in solid wood (properly bushed) across the *entire diameter of the knee and ankle*, being *fourfold* more *reliable* and *durable* than those of any other construction. All the joints are so constructed, that no *two pieces of metal move against each other in any part of the limb*. The *contact of all broad surfaces* is avoided where motion is required, *and thus friction is reduced to the lowest degree possible.*

External view.

These joints often perform many months without need of lubrication, or other attention, a desideratum fully appreciated by the wearer.



Internal view semi-flexed.

The tendo achillis, or heel tendon F, perfectly imitates the natural one in use. It is attached to the bridge G, in the thigh, and passing down on the back side of the knee-bolt E, is firmly fastened to the heel. It acts through the knee-bolt, *on a centre*, when the weight is on the leg, imparting security and firmness to the knee and ankle joints, thus obviating all necessity for *knee-catches*. When the knee bends in taking a step, this tendon vibrates from the knee-bolt to the back side of the thigh A, figure 2. It descends through the leg, so as to allow the foot to rise above all obstructions, in flexion, and carries the foot down again, in extension of the leg for the next step, so as to take a firm support on the ball of the foot. Nature-like elasticity is thus attained, and all thumping sounds are avoided.

Another tendon H, of great strength and slight elasticity, arrests the motion of the knee gently, in walking, thus preventing all disagreeable sound and jarring sensation, and giving requisite elasticity to the knee.

A spring, of metal or other material, as rubber, &c., lever, and tendon I J K, combining with the knee-bolt, give instant extension to the leg, when it has been semi-flexed to take a step, and admit of perfect flexion in sitting.

A spring and tendons in the foot L M N, impart proper and reliable action to the ankle-joint and toes. The sole of the foot is made soft to insure *lightness and elasticity of step*, and accommodate any surface.

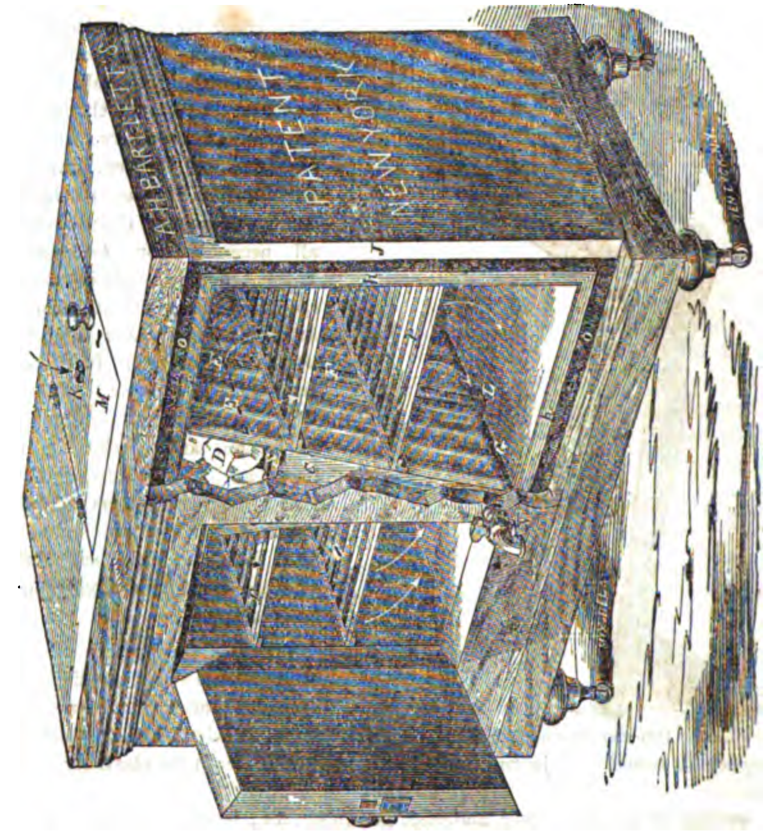
The stump receives no weight *on the end*, and is well covered and protected, to avoid friction and excoriation. These joints, springs, and tendons are all *patented*.

Fig. 3, is an external view of Palmer's perfect model. (A gold medal having been before awarded.) [*Diploma*.

Bartlett's Patent Ventilating Polar Refrigerator.

Bartlett & Lesley, 426 Broadway, N. Y.

This refrigerator is constructed upon scientific principles. The ice receptacle is made in a wedge form of corrugated zinc; and it is placed in the middle of the box, and forms two separate and distinct provision chambers; either one of them, it is claimed, is as effective and convenient as the whole of any other in use. The ice is placed in the upper section of this receptacle upon a strong rack; immediately beneath the rack is a filter, through which the ice-water streams as it melts, falling into the lower angle, where it is retained for its frigerific properties; or to be drawn off, with fresh water added, for drinking or culinary purposes; an overflow pipe is arranged so that the water cannot, by any contingency, reach the ice. It is self-ventilating, and no one article of food will impart its flavor to another. But its



greatest feature is the manner by which the moisture is taken from in and around the provisions. This is done by leaving exposed to the provision chambers the corrugated sides of the ice and ice-water receptacle, whereon all moisture is immediately condensed and carried off through the waste-pipe. It is well known that provisions will keep better out than in most refrigerators; the reason for this is obvious. The moisture in the air (finding nothing colder than itself) is deposited upon the provisions, thus causing them to become mouldy and musty.

The first five sizes are the usual sizes for families.

	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.	No. 7.	No. 8.	No. 9.
Depth from front to rear,..	19 in.	20 in.	21 in.	22 in.	23 in.	24 in.	25 in.	26 in.	27 in.
Height of box,...........	27	29	31	33	35	37	39	41	43
Width,..................	34	37	40	43	47	50	56	62	68
For height with legs add 8 inches.									
Prices,..................	$16	$20	$25	$30	$35	$40	$50	$60	$75

[*A silver medal awarded.*

THE FARMERS' CLUB.

This Club was organized on the 22d day of June, 1843, and is the oldest association of the kind in the United States. Its affairs are conducted under the auspices of the American Institute, and under the immediate direction and control of the Committee on Agriculture. It is purely a voluntary association, and its meetings are entirely free and open to farmers and others, from any part of the State of New York or elsewhere. The entire expenses are borne by the American Institute, whose recording secretary acts as the secretary of the Club. Some of the most distinguished of the scientific men of our country, as well as amateurs and practical farmers, take part in its proceedings. So far as is consistent with the dignity and importance of the matters under discussion—a colloquial rather than a didactic turn is given to the general proceedings. This free conversational style of inter-communication with the members has many advantages. There is not only a freedom from restraint, but experience has shown that extemporaneous incidental facts are thereby frequently presented which, in a more formal plan of procedure, would fail to be elicited.

It is worthy of remark, that almost every discovery in agriculture or horticulture, as well as every hint, suggestion or hypothesis of any importance, that appears in the agricultural journals of Europe, are first presented to the American public through the Farmers' Club; Mr. Meigs, the secretary, briefly, and usually without introduction or comment, presents to the Club the fact or the proposition in the precise words of the author, or of the journal from which he translates or quotes.

As a matter of course, where the proceedings are conducted on the desultory plan here indicated, more or less incoherency must characterize the discussions. But any objections which may arise from this cause are amply compensated for by the additional interest which is thus given to the debate.

In presenting the proceedings of the Farmers' Club to the Legislature as a portion of the Annual Report of the American Institute, it has been the practice heretofore to simply furnish a literal copy of the minutes or reports of the several meetings. I see no good reason for a departure from this practice. It has the advantage of imparting to the printed volume of Transactions much of the freshness which gives interest to the verbal debates. Repetitions, and remarks involving neither principles nor facts, I have felt myself free to expunge.

Except those who take part in the proceedings of the Club, the names of gentlemen in attendance are necessarily excluded. The large numbers now usually present, renders any mention of individual names invidious, even if the space occupied by their frequent repetition were not otherwise objectionable.

Among those who contributed to the general interest and usefulness of the Club during the year, by their presence and participation in the proceedings, were the following gentlemen:

Robert L. Pell, Professor Renwick, W. Lawton, Jno. G. Bergen, A. S. Fuller, Judge Doughty, and Dr. Trimble, of New Jersey; Rev. Dr. Adamson, from the Cape of Good Hope; R. G. Pardee, Lieut. Bartlett, T. W. Field, W. S. Carpenter, Messrs. Chilson, Provost, Treadwell, Berrian, Veeder, Bruce, Robinson, Church, Peck, Burgess, Underhill, P. G. Bergen, A. Bergen, P. S. Titus, Montgomery, Holton, Waterbury, Quinn, Leonard, Prof. Hedrick, Davoll, Kingsbury, Wright, Wheeler, Dodge, Cavanach, Young, Witt, Meigs, Ireland, Holton, Andrews, J. Blunt, Nash, Hite, Maxwell, Wakeman, Professors Mapes, Nash, and others.

Communications on any subject connected with agriculture, or letters of inquiry relating to farming or any of the kindred branches of agricultural or rural pursuits, may be addressed to the "*President*," or to the "*Committee on Agriculture*," of the American Institute, or to the undersigned.

THOMAS McELRATH, *Cor. Secretary.*

AMERICAN INSTITUTE ROOMS, New York, *April*, 1860.

The Report of the American Institute made to the Legislature last year, and which forms the volume of Transactions for 1858, contains the proceedings of the Farmers' Club up to and including their meeting of the 11th day of April, 1859.

On the 9th day of May, 1859, at the new temporary repository of the American Institute, corner of Fourth avenue and Eighth street, (Cooper Union Building,) the Farmers' Club convened in the room assigned them by the committee.

Present—Forty-nine members. Hon. Robert L. Livingston in the chair.

Mr. Meigs, the secretary, presented and read the following selections made by him from the works recently received at the Institute:—

CALIFORNIA.

Report of the Second Industrial Exhibition, by the Mechanics' Institute, San Francisco, from the 2d to the 26th of September, 1858.

GRAPES.

"California will be one, if not the best, of the wine-growing countries in the world. From San Diego to Shasta, and from Monterey to Crescent City, the grape grows to the greatest perfection, next to the very *placers of gold*. Some ten millions of acres can be cultivated in this noble fruit."

POTATO.

The committee reported the best one exhibited to be the "*Boston Pink*," raised in Alameda. They are small compared with the *Oregon Red*, so extensively raised along the coast, being only about half as large, but firm, smooth, entirely free from that course and stringy nature which characterizes the great mass of the potatoes grown in California.

The greatest evil attending the culture of potatoes here is the disposition to grow larger every year, and become coarse, hollow and stringy.

The imported *Marrow squash* soon becomes mammoth, losing its good quality.

No country exceeds this for growth of hops.

The Chinese sugar cane is approved.

A German company, near Los Angelos, are planting *half a million grape vines*. Sainsevain & Co., will make 150,000 gallons wine. The wines resemble Muscatel, Port, Claret, Burgundy, Sauterne, and Sherry. The brandy is well approved. Sainsevain & Co., have bottled over 50,000 *bottles* of "Sparkling California."

The taxable property of the State is $160,000,000. The annual gold $95,000,000, with the probability of increase. The mining region contains about 14,000 *square miles*, besides the gold in the mountains. Platinum is widely diffused. Our quicksilver mines at New Almaden are the most productive in the world. We have magnetic iron, sulpher, coal, palladium, chromium, antimony, nickel, cobalt, sulphate of iron, tin, bismuth, arsenic, manganese, borax in pure solid state, iodine, obsidian carbonate of soda, porcelain clay, salt, of superior quality in unlimited quantity, native soda, gypsum marble, of the most beautiful varieties, saltpetre, in large quantities.

The wheat land seems not to be exhausted by annual cropping; sixty bushels an acre is common; 120 have been grown on an acre. We can grow rice, sugar cane, &c.

The French grape crop is about, at best, 5,000 lbs. per acre. Ours is ordinarily from 10,000 to 18,000, and 15,000 lbs. an acre is not unusual. Last year we raised *fifty-one thousand tons of grapes*.

BOTTS IN HORSES.

SOUTHERN HOMESTEAD, NASHVILLE, TENN.
April 28, 1859.

A Certain Cure.—When your horse is complaining, looking around at his side, lies down pretty often, is not swollen, you may very readily conclude that he has the botts. Lose no time in giving him a quart of sweet milk and molasses, and as you let his head down after he has swallowed the drench, slap him several times on the side he complains of most, with a paddle about two feet long, six inches wide, and one inch thick, striking him pretty hard. This process jars the botts loose from him, and they take hold of the milk and molassess. In ten or fifteen minutes after, give him a quart or a half gallon of *strong sage tea*—this kills the botts.

The secretary hoped the Club would notice the general declarations of our public journals relative to the comparative deficiency of our bread-stuffs. It is but a very few years since we imported wheat from Europe, while a hundred years ago we were called by old England, the Grecian daughter who gave her milk to the old man.

In 1770, we exported of flour and bread, 45,868 tons, equal to 458,868 barrels of flour.

In 1791, 1,000,000 bushels of wheat, and near 700,000 barrels of flour.

In 1793, 1,450,000 bushels of wheat, and 1,074,000 barrels of flour.

In 1803, 2,000,000 bushels of Indian corn.

In 1803, agricultural products, $32,995,000.

If our exports of bread stuffs had continued to increase with the population since 1803, from about five millions to about thirty millions, it would be this year nearly $200,000,000. It is said by those who know nothing of agriculture, that our lands are wearing out. One says its fertile elements are running off by rains into the sea. Italy had been treated as we have treated much of our land, before the birth of our Saviour; they said it is exhausted and we shall starve! Some 1700 years ago, Columella restored his farm to perfect fertility, and the populace said that to do it he had dealt with the devil. I have heard many say almost as much of Mapes and some others.

I wish this Club to speak now. Let our country hear and work, and there will be trouble in finding ships enough to carry the bread to Armageddon, instead of idling empty at our wharves.

THE SOUTHERN PLANTER, Richmond, Va., May, 1859, thinks tobacco raising a curse to Virginia, but tells us, what may seem odd, that tobacco growing is a good preparation for a crop of wheat. But that tobacco is the most exhausting of all crops, is demonstrated by the impoverishment of all the counties of Virginia, from the sea to the mountains, to such a degree that its cultivation is abandoned; for it is a well known fact that the richest high lands are rarely found strong enough to bear a third crop in succession. Richard Sampson, of Little Dover, says: "After a fair experiment of ten years, I cannot afford to cultivate tobacco, finding it took one half of the labor of the plantation and yielded but one fourth of the value of the other products."

The following interesting facts in relation to the *Robin* were deemed of sufficient importance to be read, and to form a page of the Transactions of the Club. The facts were communicated by *Wilson Flagg*, Esq., to the New England Farmer.

PLEA FOR THE ROBIN.

I have lately become informed of some new facts in regard to the robin, which I think may be worthy of another communication to the *Farmer*. Before I had investigated the habits of this bird, with particular reference to the services he renders to agriculture, I supposed he was only of secondary importance, compared with the blackbird and others that possess the faculty of discovering and seizing the grubs that lie concealed beneath the surface of the ground. Though the robin does not possess this faculty, he is pre-eminently serviceable in other ways; and the more I have studied his habits the more I am convinced of his usefulness. Indeed, I am now fully persuaded that he is valuable beyond all other species of birds, and that his services are absolutely indispensable to the farmer of New England. Some persons believe that the robin is exclusively a frugivorous bird and that for fruit he will reject all other food that is within his reach. Others believe that his diet consists chiefly of insects.

I then took three others from different nests, and fed them more exclusively on worms, with some fruit. Two of these also soon died, and the remaining one appeared ill and drooping. I suggested that the bird probably needed insects as well as worms, which alone were not sufficient to supply all the wants of the system, though he had access to cherries and soaked bread, of which he could eat whenever he wanted them. After this he was supplied with all sorts of grubs and insects which my son was able to capture. The robin devoured these indiscriminately and with great eagerness. He was never known to refuse one of any description; though bees and wasps were not offered to him, all kinds of beetles, moths, bugs, grubs, vine worms, chrysalids and caterpillars which were presented to him he devoured.

After this improvement of his diet, the bird soon recovered his health; and the experiment proved conclusively that this variety of insect food was necessary to the life of the bird, at least while he was young. These insects were not put into his mouth; they were placed upon the floor of his cage, and he picked them up, *killing them in a way that showed that he knew instinctively how to manage them.* I mark these words in italics because they contain an important fact. He was particular in beating the vine worm considerably before he swallowed it; but he never refused one or neglected to eat it. On one occasion, having swallowed a hard beetle, and finding it incommodious, he threw it out of his crop by a voluntary effort, beat it awhile with his bill against the floor, and then swallowed it again. This fact also proved his instinctive knowledge of the mode of proceeding in such emergencies.

It is a fact worthy of notice, that the golden robin, which has the reputation of performing more service than the common robin, may, when confined in a cage, be fed almost entirely on farinaceous food, without injury to his health. This fact is good evidence that the common robin is more entirely insectivorous than the golden robin. The contrary is generally believed.

The fondness of the robin for cherries and other fruit is not peculiar to his species; it is equally remarkable in almost all other insectivorous birds. The birds that do not eat cherries are generally of those species which are the least valuable to agriculture, such as the graminivorous birds, including most of the finches. And it is a fact which ought to be more generally known, that the most useful birds are such as are in one sense the most mischievous: they steal either our fruit or our grain. Next to the robin, probably the most useful bird to agriculture is the red-winged blackbird, called the "maize thief," from his habit of stealing Indian corn, when it is in the milk. But the blackbirds are not sufficiently numerous or familiar in this part of the country to render us a great deal of service.

The truth is that nature does not afford us a benefit without exacting pay for it. Hence, if a bird is particularly useful to our fields, he is sure to devour some portion of their produce. We must be content to pay them for their services, as we pay a hired man, for clearing our trees of borers and caterpillars. If it were possible to obtain an exact estimate of the services performed by the robin, we should be willing to pay him more than the value of what he steals, rather than dispense with his services. At present, however, it must be confessed that the robin tax falls chiefly upon those who raise cherries and other summer fruits. This is an evil which must be patiently endured for the common good. There are only two remedies of the evil to those who happen to be the unfortunate owners of cherry trees: the first is, to cut down all the trees on one's ground, on the principle of cutting off one's nose to spite his face; the second is, to induce all others to plant cherry trees, that the present possessors may have company in their misery. The extermination of the robins is out of the question as it would be hardly advisable to sacrifice the interest of all the staple products of agriculture to preserve a few bushels of cherries.

As an improvement of the second remedy, we should encourage the growth of the high blueberries, on the borders of all our pastures in all parts of the country, especially in the vicinity of large towns. I observed in the early part of the season, that the cherry trees before my windows were filled with robins, whose numbers diminished as the fruit ripened and improved in quality. The question was asked if the robins preferred the cherries before they were ripe. It was answered by remarking that as cherries became more abundant, their depredations were spread over a wider surface. This was hardly a sufficient explanation. The problem was soon solved, however, by discovering multitudes of robins in the blueberry pastures, where the berries had ripened in great abundance, and were preferred to cherries, by the robins. I am persuaded that a tree full of the finest of cherries, in the middle of a blueberry pasture, would remain almost untouched.

ON MARLS AND MANURES.

Wm. Lawton.—More than thirty years since, Sir Humphrey Davy, in his experiments, found the pores in the fibres of roots to be so small as hardly to be discovered with a microscope. Thus proving the value, if not necessity, of a weak solution of suitable manures for fertilising plants. And his experiments also furnished abundant proof that plants, like animals could be overfed; and also like animals poisoned, by taking up into their radical fibres, minute portions of substances destructive to life, probably by choking up the cells and pores of the plants.

There is then two considerations in the application of all manures, adaptation in quality, and quantity. The process of absorption of manures by the minute fibres and roots of plants is very slow, and we can readily believe that plants overfed by any soluble matter crowded upon the pores and fibrous roots, will produce the most deleterious influence.

Marl.—Varies so much in quality that no certain rule can be established for its application. Some varieties are said to contain over 80 pounds of carbonate of lime in 100, and in many districts not over five pounds, which accounts for the discrepancy in the statement received from those who have applied it. The mechanical effects must vary materially. That possessing a large portion of sand, with opening effects; that of clay, binding.

Some of the effects of marl may be thus enumerated:

Grasses.—Alters the nature and quality, and produces a higher order.

Bogs.—Covers bog land with a rich short grass.

Cereals.—Increases the quality and quantity, and the influence on the land is of long continuance, aided also by the action and application of other manures.

But marls and lime exhaust the land, not supplied, after successive crops, with decaying vegetable matter. This effect I am told is very visible in many parts of Pennsylvania.

Gypsum.—Natural gypsum also varies in quality, but its invariable constituents show clearly the cause of its fertilizing influence.

Thus in 100 parts: Some—water 22, sulphuric acid 46, lime 32; others, water 33, sulphuric acid 30, lime 32.

Distributed on grass lands early in the spring, when the blades are covered with dew-drops, it has always been found beneficial. The dose may be very light, and the effect may be seen for years.

THE CHESS QUESTION.

A letter from from Geo. F. Dinsmoor, of Elk, Warren County, Pa., was read, as follows:

"I was somewhat surprised, and perhaps a little provoked, at a remark I saw in the Tribune not long since. It seems some one had sent the editor a head of wheat with chess growing on one side. The Tribune responds to the effect that 'everybody knows now that wheat will produce chess.' Some thirty years ago I demonstrated by actual experiment that the thing could be done, and produced chess from wheat in a dozen instances. I can do it any time. It only requires to select seed that has been thoroughly impregnated with the pollen of chess, and then subject it to circumstances that would kill wheat and not chess, which is a hardier plant, and the result will be chess every time. When I had satisfied myself in the matter I said so, and subsequently wrote and published so, and endeavored to convince the farmers that the way to eradicate chess, was to select seed among and near which no chess has grown. I found many practical wheat raisers to agree with me. Our statements were met by agricultural papers only with ridicule, and an array of arguments which might have been indited by the legitimate owner of a bramble. I remember one editor nailed the question, triumphantly, by saying that wheat could not produce chess, because it belonged to a different class of vegetables, as if Linnæus or somebody else, by writing about it, could impair the native powers of the plant. I should like to know when everybody became possessed of this secret, or whether the term everybody includes the whilom editors of agricultural papers."

RENOVATING OLD ORCHARDS—PRUNING.

Solon Robinson.—I rise to ask a question. I want to know whether I shall cut away all the drooping branches of an old apple tree—the limbs that hang from the under branches, and some of them almost to the ground. Some say that such limbs should be shaved off—that is, all that fall at the extremities of the branches—below the level of the plane of their insertion into the body of the tree. Others say that these drooping limbs should only be cut away where they are in the way of cultivators of the soil under the trees.

Wm. Lawton.—I have often observed that those drooping limbs are the most liable to be attacked by insects, and that they have less fruit in proportion than the upper and more upright branches.

Andrew S. Fulller.—If a branch is bent below a level, it will produce more fruit than those above the level, if they are not too much in the shade. If those drooping limbs are sound and healthy, and the sun can reach them, I would not cut them away. The French horticulturists distort the limbs, and bend them down, to make them productive. In pruning, I would always cover the wound with grafting wax, made of the following ingredients: One pound of rosin, half a pound of beeswax, and a quarter of a pound of tallow. This is the composition of the old style of grafting wax, and none that I have ever tried is better. I would spread this upon cloth, and cover all wounds made in pruning, particularly all large limbs, and small ones too, unless pruned at a time when wounds heal readily.

John G. Bergen.—Much pruning is done too early. In the Summer, all small limbs cut off will heal without covering the wounds, and none should be cut at any other time—say in the month of June.

Judge Meigs.—I have seen an apple tree in June, completely denuded, and it lived and made new bark. We have one case on record, where a malicious person stripped an orchard, and it rather benefited it. This was in midsummer.

BUDDING.

Mr. Fuller.—I stripped a linden tree, eight feet of the body, when in full leaf, and it did not hurt it. There is no fixed time for budding I have succeeded well in October. It depends altogether upon the condition of the stock. No author can give direction when to bud trees; it must be done at a particular growth of the stock, and they vary mostly in point of time. The books say bud roses in August. Yet, if you will, get buds from green-houses and insert in stocks in open ground.

I can bud now in May. I do not condemn books that give directions about the time to bud, because they are suggestive; but the directions sadly lack adaptation. The right time to bud, is just before the stock stops its summer growth. I will give some illustrations of budding, as I do it, at the next meeting.

FENCES AND ESTRAYS.

Mr. Blunt said he wished the Club would discuss the fence question. The law about fences in this State, is one that should be discussed and amended. Cows are taught in the country upon the same principle as city street children—that is, to go out in the morning and bring home enough to support the family over night.

Mr. Lawton.—In New Rochelle we have no occasion to keep our garden gates shut. No animal is allowed to run at large. This should be the universal law. It is, in Massachusetts. Garden and streets are open together in some towns.

EMPLOYMENT FOR WOMEN.

Mr. Blunt.—In regard to the movement being made to influence women to take a greater interest in agricultural employment, I am glad to have it discussed. We need more emplopment for the idle, and those who would work if they could, who are dragging out miserable lives in the city. Women take the lead in the harvest fields of England.

Mr. Fuller.—It will be very becoming employment for women to work among fruit trees and flowers, but not to make slaves of themselves in digging, or in the harvest field. I should like to see them good botanists and horticulturists.

A letter from Daniel Barker, of West Meriden, Conn.

CINERARIAS.

"This beautiful class of plant is not half so well known or cultivated as its beauty and easy culture entitle it to. For the conservatory, green-house or drawing-room culture they are indispensable. With ordinary care and attention, they may be had in flower from October until June; and, with a good collection, flowers can be cut for bouquets during the entire winter months, when Flora has but little to present us with. But this is not their only merit; for the decoration of the drawing-room, for evening parties by gas or lamp light, their beautiful colors are seen to the greatest advantage, the appearance being much more beautiful, if possible, than by daylight.

"The plants from which the accompanying flowers were cut, have been in magnificent bloom since last fall; consequently, they are not now as fine as some six weeks since. Some of these specimens from which they were cut, measured *nine feet six inches in circumference*, and were one entire mass of flowers. They are, moreover, pure natives, having been raised from improved varieties in this country. I have imported the best European varieties for some years past, and, beautiful as they have been, I have never seen any which, for general good qualities, such as compact habit of growth, well formed and brilliant colors, flowers, &c., equal them.

"The Calceolaria, scarcely less valuable—the beautiful varieties of which are 'legion'—are just commencing to flower, and will remain in perfection for several weeks. The beautiful varieties of American origin, are unsurpassed by any hitherto introduced from Europe."

Solon Robinson.—I also wish to call the attention of the Club to the description of a beautiful climber, which I clip from *The Country Gentleman*—the *Clematis flammula:*

"No one who has a place for climbing plants, should be without the beautiful and fragrant 'Clematis flammula.' It is a rapid grower, making fifteen or twenty feet in a season. The foliage is delicate, and the flowers, which are produced in profusion for three months, are of a pure white, and delightfully fragrant. I do not know a more desirable vine for a partial screen for a window or a piazza. It can be trained to strings or wires without any trouble, as it throws out delicate tendrils from the base of the leaves, which cling to the nearest object."

Mr. Fuller.—This plant is all that the writer says of it. It is perennial, growing from cuttings or seed, true to its kind every time.

Mr. Lawton.—I fully indorse these statements. I have it growing at my place.

Mr. Meigs.—So called from the greek word Αμπηλος, *Ampelos*, a grape vine.

Mr. Fuller.—The Ampelopsis, tri-color, is also a splendid climber, and grows from the seed. To grow Clematus from seed, plant them in the fall, and keep them wet—not merely moist, but wet, all winter.

Mr. Kenney of Milford, Hillsborough Co., New Hampshire, exhibited a working model *stump extractor*, patented by him. It extracts the largest oak stumps quickly by one or two horse power.

Mr. Blunt proposes for next meeting, the subject of "Fences, outside and inside of farms." Adopted. "Flowers," too. Adjourned.

H. MEIGS, *Secretary.*

May 16, 1859.

Present, 33 members. Mr. John Bruce in the chair.

The Secretary read the following extracts prepared by him from the works recently received by the American Institute from Europe and home. viz.:

[Revue Horticole. Paris, March 1, 1859.]

JASMINUM GRANDIFLORUM.

Although long cultivated, our amateurs and gardeners are still fond of it. Its white flowers, tinged with rose, have an agreeable perfume, and last long. The pruning of this plant is very important to its vigorous growth and flowering. We generally do it in February and March, leaving but four to six buds. This Jasminum wants to pass the winter in a conservatory.

MYRICA—(Linnæus called the genus,)

Is found at the expense of the great group the Amentacea Catkins (Birch) establishing the passage from the Betulaceæ to the Casuarinaceæ (Beef-woods), approximation to the Conifera, found in Australia. The natives make war clubs of the wood; *it looks in color like raw beef.*

It grows as a shrub as well as a tree. Its flowers are dioique, the males having from four to eight stamina and a hypogenous scale, naked internally; the females have ovaries surmounted by a simple stylus and two stigmata. We call the plant Myrica. Theophrastus called it (2100 years ago) Tamarit. The name Myrica is from the Greek *murike*, that from *muron*, perfume. One of them yields wax.

THE ANECOCHILUS.

On the lofty mountains of the East Indies and the Moluccas, we have found a plant under the shade of trees, in a humid air, a small plant whose leaves have a surprisingly brilliant color. The natives call it *Petola*, by which they mean a cloth of silk of brilliant color. It has been taken to Europe, and Mons. Blume has called it (at Leyden), genus Anecochilus.

FOOD.

The substance of the following paper was submitted at the London Society of Arts in January last, 1859.

On the Pampas of Buenos Ayres, a lank, lithe, wire-haired, dark-looking, black-eyed race of men ride constantly on horseback, and feed on the flesh of animals, but chiefly beef, roasted with the hot blood in it, by fires of dried dung, if allowed to get cold it becomes tough. Horses, mules, deer, have sweet flavor when eaten fresh. A man will devour at a squatting, without salt or vegetable, four or more pounds of it. At intervals of four to five years a drought occurs, the grass is destroyed, and the neighbhorhood of the dried up streams becomes a cattle Golgotha, thus manuring the land for the next rains. *Nature deals in compensations* in Chili; meat is a luxury of the wealthy, while the laborer feeds on dried beans and bread when they can get it. Chili is a Landocracy, and the small tenants store up their scanty potatoes, pumpkins, beans, red pepper and onions, with wheat, if they can. In years long past, one shilling a bushel standing, two shillings a bushel after reaping, and four shillings in the mid interval between season and season. One year, known as the flood, on account of heavy rains, the crops usually grown by irrigation, failed by blight, the price rose to six shillings; the poor people sold all their best wheat and saved the worst for seed. Next year the price rose to twenty shillings a bushel, $5.00. And in this, the garden of the Pacific, that used to supply all Peru with breadstuffs, large numbers of people were reduced to eat wild herbage and seaweed; many perished. Then for the first time barrelled flour was received round Cape Horn from the United States. Chili prays for snow, *not for rain*, for when the mountains have plenty of that the streams from them make the wheat on the plains. The lowest level valleys are the most rich, *terras di riego.* Locusts sometimes destroy their crops.

"What bird is that?" "One of bad omen, Senor; the leader of those birds who will leave us no bread to eat;" and so it was. They came on and on, a hideous brown cloud shading the sun, with horn-sheathed eyes and cutting forceps that left the trees leafless and the ground bare.

They have granaries. Some in holes in the dry earth lined with stones. These are filled with wheat, the upper third part of which cakes, and keeps the rest. Also, whole skins of oxen—the flesh and bones being all drawn out through the neck—filled with earth to cure it—then with wheat. A row of these stuffed with wheat resemble the Assyrian stone bulls, side by side—horns suspended just above ground.

STRAWBERRIES.

Samuel Edwards, of Bureau county, is said to produce one hundred bushels of strawberries per acre, as cheap as corn. Dr. Pennington, of Rock river, grew on a ten acre orchard $6,000 worth of apples, the trees being from eight to fifteen years old.

PLANTING TREES ON HIGHWAYS.

The Fairfield County Agricultural Society, Conn., has voted a premium of fifteen cents a tree for every row of forest or fruit trees, not less than twenty, set out on any park or highway in that county this spring. The premium to be paid for all those living next September, at the county fair.

Chicago has established an *Audubon Club*, (care of birds.)

Mr. Bergen.—I have no doubt of the cost of our fences, but I don't know how farmers can dispense with them. Some people will let their cattle run at large and sending them to the pound don't do much good. For my part, I prefer to graze cattle, and so I must have cross fences. Unless we soil cattle, we must have inside fences to protect our own crops. In my opinion, this question will regulate itself. When the time comes that it is best to do without fences, the farmers will dispense with them. I don't know that we shall change anybody's opinion by talking over the subject here in this Club.

Solon Robinson.—In my opinion this is a question of great importance to the people of this country, and whatever we can say here to induce them to think upon the subject will be of advantage. Let them talk over the matter among themselves and determine, if they can, that the present system is better than the almost-no-fence system that I advocate. Whatever we say, that will have a tendency to make people discuss this question will be of advantage to the country. Before men act they must think. It is our province to give them food for thought.

Mr. Meigs.—Some think that our United States pay more for their fences than their houses, so short is the duration of the fences compared with their houses.

A few years ago, a committee of the American Institute visited the farm of Elijah Kimball, at Flatlands, and found an hundred acres without an inside fence—the magnificent crops divided by convenient wagon paths from each other. The only interior inclosure was the manure yard, which besides all the manure of stock, received all refuse materials and muck from meadows, which the stock by treading, &c., improved much. Such a beautiful farm led the committee to suppose that the master, his family and house were appropriate. We found landlord and lady full of intelligence and enterprise; his dwelling, library, garden, &c., all in like style. None better can be wished for on earth. The learning and the practice had met here, and the land rejoiced. Our greatest premium on farms was given to Kimball's fenceless farm.

Solon Robinson suggested that the plan of storing wheat in the ground was a good one for the prairie farmers. Not, however, skins of cattle; but pits could be dug and cemented exactly like cisterns, with only a small mouth, and there is no doubt grain could be kept safely in this way—probably more so than in any other way.

Judge Meigs—It is the old Egyptian way of storing grain, and a very good way it is, too.

Solon Robinson—Yes, in a country so destitute of wood as the great prairie wheat region of the west.

THE CURCULIO.

Dr. Trimble, of Newark—What will cure the curculio is an important question. Dr. T. exhibited some live curculio, and also some limbs of plum trees with black knots, which he contended were made by the same insect that affects the fruit. This, he says, he has proved to his full satisfaction by repeated experiments. The plum rot, he also thinks, is produced by the curculio. He says the whole subject of the curculio seems to be misunderstood. He has bred the insect from the larvæ found in the black knot and from the fruit, and found them identical. He thinks that the race may be propagated in the bark, and thus continued in existence when the fruit entirely fails. By watching the trees at this season the commencement of the black knot may be detected, and that is the time to cut off the branch. If the egg is taken out of the limb or fruit, it will go on to perfection. There is no poison from the perforation—it comes from the growth of the insect. He has never found any remedy, except shaking the insects off upon a sheet and killing them, and by so doing he has raised one hundred bushels of apricots a year. The insect never touches the apple and peach as long as it can find plum or apricots. For want of its favorite fruit it will take apples and other fruits, and it is the cause of so many defective apples as we find in market. To keep curculio out of an orchard, requires constant attention for six weeks. The trees want shaking some days several times a day, and it is by that alone fine plums and apricots can be grown. Sometimes in a very severe drouth at the time the stung fruit is falling, the larva perishes, because unable to penetrate the earth. The sting of a curculio is known by a peculiar crescent-shaped mark where the perforation is made. The insect has a peculiar shaped and strong proboscis, with which the wound is made in which to deposit the egg.

It takes from four or five days to two weeks for the eggs to hatch, and if it is desired to take out the egg it must not be neglected until it hatches. The insect seems to have the power of secreting a sort of wax, which it cements over the egg. I have never found any advantage in the use of all the nostrums recommended to prevent the curculio.

John G. Bergen—I have apricot trees on my place that are never attacked. They stand trained against the southwest side of a building. My plum trees, in open ground, are severely affected. Mr. Steele, of Jersey city, stated here, the other day, that he saved his fruit by using whale-oil soap. A neighbor of mine saved his fruit by the same application, with a little sulphur added. He went up a ladder with a watering pot, and poured it over the trees, with such good effect that he now intends to apply it with a proper syringe.

Andrew S. Fuller.—We have had a great many remedies, and some men want great sums for their discoveries how to prevent curculio, yet all fail. Whale-oil soap is recommended to kill bugs, yet I have tried it, and found the bugs would live in the soap; of course it would not kill them. Some simple remedies will answer one year and fail next. I remember when I could not sell green gage plums in Rochester at twenty-five cents a bushel; that our trees were covered with black knot, but the fruit was not affected. Why was this, if the same insect stings both limb and fruit? I don't believe it is the same curculio that stings the fruit that makes the black knot.

The pea-bug is a curculio, but I don't think it would live if the egg was inserted in a pumpkin. I can easily see the egg of curculio in fruit, and the crescent-shaped puncture, but I never could see either in the limbs of trees. I believe that the same insect stings the plum and Morell's cherry, but is not the same that stings the apple.

Prof. Nash.—At what rate of advance over a country do the curculio progress?

Dr. Trimble.—I don't know; they fly rapidly, and go from one orchard to another, and always attack the outside rows first, and progress into the interior of the orchard slowly. I have seen plum trees at Hudson growing on a stiff clay, entirely unaffected with curculio, while upon light soil around all were destroyed. To shake off the insects, make a square sheet, and cut it to the center to straddle the tree, and sew on sticks upon the ends to carry it by from tree to tree. A few jars of the tree will bring them down upon the white sheet, where they are easily seen and caught. This shaking must be done every day, except cold, rainy ones, when the pests keep quiet.

John G. Bergen.—A neighbor got rid of curculio by digging deep, and turning the larvæ deep into the earth.

Mr. Fuller.—I dug around a tree eighteen inches deep, and then put on a thick coat of coal ashes, and it did not do a bit of good toward preventing the insects coming out in due time.

Mr. Meigs recalled the old Egyptian plan of storing up wheat in years of plenty. A good plan at any time, but not so necessary in a whole continent like ours, where wheat always grows somewhere.

Our friend, Mr. Steele, of Jersey city, invited a committee of the Institute to view his successful treatment of plums. We found that by *vigilance proper*, his plum trees bore as many of the most perfect plums (Green gages), as the branches of trees could sustain; every branch was a wreath of plums.

POTATO ROT REMEDY.

Prof. Nash—I have received a letter from a woman at Binghamton about the potato disease, which says that potatoes and pumpkin vines grown together have invariably prevented the potato disease. Another person finds that coal ashes is a remedy. The theory is, that the coal ashes are offensive to the bugs, and that the bugs are more fond of pumpkin vines than potato leaves, and so they let the potatoes alone for more favorite food.

John G. Bergen.—It is a common practice on Long Island to grow pumpkins and potatoes together, and yet the potatoes do rot—pumpkins won't save them. Besides, it is a very different bug that works upon potatoes from the one that eats pumpkin vines. So that theory won't do. People are too apt to jump at conclusions from single experiments. The truth is that no theory has been advanced about the potato disease that will stand the test of practice in all parts of the country.

THE COST OF FENCES.

The fence question was called up and partially discussed, and continued to the next meeting.

The Chairman said that he was satisfied about the inutility of fences. He remembers but few fences in Scotland, except along roads or between proprietors. Cattle are kept by shepherds and their dogs, and fed right alongside of grain fields, with but little damage to the crops.

Prof. Nash.—My observation in Scotland is that the cattle are only kept under control by constant vigilance. We have double the amount of fences upon all our farms that we should have. For permanent fences we should Kyanise our wood, and then it will last almost as long as stone.

Mr. Meigs.—The curculio is a coleopter, the family of which is very large. He has sheaths for his wings—so called from the Greek *κολεος*, a sheath, and *πτερον*, a wing. He can bore a hole in a tree and in the ground. They are the most numerous of all the orders of insects. Latreille, in his noble work on insects, divides them into Pentamera, Tetramba, and Trimera. The larva is a worm with a hard head. He makes a cell in the earth, of oval form, and there changes into an inactive pupa, of a whitish color, with the wings and legs folded on its breast. But their habits *vary very much*, both in their immature and in their perfect state. The Orthoptera are more closely connected with these Coleopteræ than any other mandibulate insect.

Mr. Fuller.—Some have dug up the ground under the trees! Some cover it with coal ashes. All succeed excellently well when there are no curculio there.

FENCES.

Prof. Nash.—We have twice as much fence as we need. Outside fences, perhaps, will be difficult to dispense with. Our wooden fences are very costly, and of short duration. Cannot something like Kyanizing be done to make them lasting?

Subjects for next meeting.—By Mr. Blunt, "Fences." By Mr. Robinson, "Noxious Weeds and Plants—their origin, spread, and how to get rid of them. By Hon. J. G. Bergen, "Grasshoppers and other noxious insects also."

The club adjourned to Monday next.

H. MEIGS, *Secretary.*

May 23, 1859.

Present, forty-five members. Mr. R. L. Pell in the chair.

[By Mr. H. Meigs.]

A BOTANIC GARDEN FOR NEW YORK

Is one of the most wise and admirable institutions of any people. The world admires that of France—the Jardin des Plantes, in Paris.

Our learned citizen, Dr. Hosack, commenced one here in 1801. He purchased from the corporation twenty acres of land, and in 1806 had already formed the noblest collection in America. It was a spot to which I resorted with more pleasure than any other. He expended seventy-eight thousand dollars upon it, and believing that it should be sustained by government, he submitted that idea to our Legislature, who purchased it, to our great joy, anticipating that the power of the State would make it the Jardin des Plantes of the United States. But we soon saw the difference between the care of the learned Dr. Hosack and *government employées. The garden ran to ruin immediately.* The State finding this, made it a present to Columbia College.

In the varied progress of our city, the Elgin garden is now city lots, very valuable to our venerable college, *under whose trees Hamilton studied!*

Yet New York ought to have her Botanic Garden as well as the city of Paris. Russia has a grand one, under glass, where some 1,200 orange trees bear fruit while the external temperature is 30 degrees below zero!

Such a garden here should have such a society as Napoleon's, for the *acclimation of plants.*

The well distinguished John Stevens, of Hoboken, gave many valuable exotics to the Elgin garden. So did the eminent Chancellor Livingston.

Dr. Hosack had accumulated in 1806 no less than 1,738 varieties of the most interesting plants.

While Dr. Hosack was thus nobly striving to make us a Jardin des Plantes, his favorite scholar, young Dr. Francis, was nobly siriving to form a Historical Society, and I, as an early member thereof was greatly surprised to learn that he, out of his early professional earnings had contributed to this favorite of his no less than *eight thousand dollars.* I do not know that he was ever reimbursed; but I do know that *seventy thousand dollars* from his learned master Hosack for a garden, and *eight thousand dollars* from his learned scholar Francis for History, were remarkable for their greatness, and stand forth now as monuments to their fame. I therefore record the facts in our American Institute. The State nobly prints its annual Transactions, and we send them to all the nations.

The Secretary then read the following translations and papers, prepared by him since last meeting:

[Journale de la Société Impériale et Centrale d'Horticulture.—Napoleon 3d, Protecteur. Paris, March, 1859.]

THE INSECT DESTROYER

Has proved of great utility. Lyon, who first introduced it here, received a silver medal from the American Institute. The powder was tried and proved to be not dangerous to human beings, while it destroyed insects. It is now stated to be a species of Chamomile, the *Pyrethrum roseum* of Biebers, and the Pyrethrum carneum, also. The powder of these obtained the name of *Lowizachek* in Armenia—of *Bug flower—Powder of Persia.*

Mons. Gehin has emplowed for the same purpose, successfully, the *Stinking Chamomile,* Anthemis cotula, which abounds in uncultivated fields, throughout France. The Russians of the Crimea use Aristolochia Clematitis for the same purpose. In Ragusa and all Dalmatia, they use a Crucifer, the *Lepidium ruderale.* They pulverize the whole plant. The Insectiade powder is made of the flowers, seldom of the leaves. In Paris they use a saw dust from the cedar family, commonly called American cedar, *Cailcectra,* the *Cedrela odorata* of Linnæus. The powder of Chamomiles has been well proved to be of remarkable efficacy. Their cultivation is now extensive in several parts of Europe. The *Pyrethrum of Willemot* is hardy, flourishes near Paris. It resembles the two others, the *Roseum* and *Carneum.* It prefers to grow in dry, sandy land, with southern exposure. Sow it in April—set out the plants in May. The good plants will flower from May to Autumn.

HISTORY OF THE CALENDAR.—BY W. A. DUPUIS.

It condemns the foolish, blind faith in Almanac weather predictions.

The Imperial and Central Society of Horticulture, Napoleon 3d, Protecteur, Paris, has nearly 2,000 members, of first class men and women. Of the latter—ladies of first rank, as patronesses, about 163.

The first turkey eaten in France were at the nuptial feast of Charles 9th, in 1575. Belo confounds the pintado or Guinea hen with our turkey, in his account of Rome.

The Canary bird, so plenty in the Canaries that you can kill twenty at one shot, came there with the first Spaniards.

A domestic Swan was unknown to Aristotle and Pliny. It was first domesticated in the middle ages.

The *Bardan* of Japan resembles sunflower, bears cold and drought well, leaves smooth and bright green flower, lively purple. Seeds must be sown as soon as gathered. The roots are large, eat like artichoke, very wholesome ; cook as scorzonera.

Dr. Sicard, of Marseilles,—note on the degeneracy of the Chinese sorghum, since its introduction into France.

[Journale de la Société, &c., &c., Paris, February, 1859.]

THE VANILLA

Is an Orchid, growing on the bark of trees, &c.; climbs like ivy. Its perfume is owing to the crystals of Benzoic acid which form on the pod. —[Meigs.]

"We are indebted to Mons. Mouquin Tandin for information. It is found in Mexico, in Java, and other islands of the Eastern Archipelago, and in our tropical regions. It requires a year to perfect its perfume. It is gathered in December, in Mexico, chiefly by Indians, who dry the pods in the sun, and then plunge them into oil from the nut of the mahogany tree. They do this to exclude the air. Some thread them together by the stem ends, dip them in boiling water, hang them in the sun for some hours, and then with a feather or a finger oil them all over.

INSECTS.

The Institute has received, by the last steamer, some of the Parisian works relating to agriculture, &c. Among them an article on insects written by Victor Chatel (de Vire), Antwerp, 14 Boulevard de Paris, from which we translate the following:

In the various notes I have published since 1853, in reference to the disease in potato, grape vine, mulberry, apple, colza, peas, beans, &c., I have persisted in spite of the opposite opinion given by many French and foreign savants, to attribute to insects instead of some abnormal condition of atmosphere, the disease in question, sustaining always my opinion by facts—such as the *oidium* on vine, *botrytis* on potato, *erysipelas* on pea, *rust* on beans, *fusisporium lateritium* (the 4th order of Lindley, in his vegetable kingdom of the Fungales, Hyphomycetis on the mulberry, &c., &c. Admitting, however, in the potato and grape malady, the concurring influence in these two cases, of an abnormal atmospheric influence not yet scientifically defined. We hear on all sides that fruit does not keep as it used to—that it becomes spotted and rots. Convinced more than ever that it is by study and statement of facts, rather than theoretical discussions that we shall arrive at the resolution of the problem, I point out what I have discovered of facts. On many sorts of potatoes, the insects which cause the disease are microscopic—there are four distinct species of the *Acarus*, of which one only is known, the *Oribates castaneus*, and one of the Cochineal family, *la cochenille en bateau de podurelles, &c.* On certain parts of fruit, the acarus traces little furrows in lines, sometimes straight and sometimes irregular—very superficial—sometimes these lines are traced from the stem in right lines but short ones. Some apples, for example, the *Rat d'Or*. It is by night only that the acarus works; this little insect becomes of a red scarlet color in the fall. In the spring I find it on the young leaves next to the apple and pear buds, but before these bloom it makes reddish spots on the young leaves. *It runs extremely quick.* The second species has scarce long hair, whitish like its body, is much like mites in old cheese, figs, old wheat, and flour, &c. The third *Acarus* is almost cylindrical in form; short, dull white color; its fore feet *rose tinted*, generally. The largest sort, *Oribates castaneus*, is dark chesnut-colored, shining; it resembles a little coleopter, hardly ever seen on apples and pears, except in summer; it has a keen point on each side of the anterior part of the abdomen. These prick our apricots, making little scabby pustules on them, on the sunny side especially. It is frequently found, at *night only*, on the pears. Bonne Louise d'Avranches, Doyenné d'Hiver, Beurré d'Amaulis, Saint Germain, &c., particularly where two pears happen to touch. I have many times found it upon potatoes, and in a flat form. I have found it, the white acarus, on *truffles*, flat and different from those I have spoken of.

A BARREN APPLE TREE.

Mr. Solon Robinson—Charles D. Davis, of Syracuse wants to know how to make a barren apple tree productive. It is a Baldwin, a foot through, in vigorous health, blossoms full, and fruit set and drops while small. The soil is black clay loam, on clay subsoil. Who will answer this question?

I will call upon Andrew S. Fuller, who is a practical grower of trees, having been bred to the nursery business.

Mr. Fuller—I can only answer that trees in such rich, mucky soil grow wood fast, and make good nursery trees to sell, but not to bear fruit. They are spongy, and the wood is not solid, nor as heavy as trees grown in harder soil. I would dose the land around this tree with lime, salt, ashes and bones, and grow something to make the soil poorer, or change its mucky nature.

Solon Robinson—In this Syracuse letter above quoted, the following question is asked: Will it pay to apply the mixture of lime, slacked with water saturated with salt, to wheat, oats, barley and grass, grown on clay, clayey loam, or sandy loam—to land somewhat severely cropped, cold and wet. How much to the acre, and where is it best to apply it? As a general rule it will not pay to apply anything but draining to land that is "cold and wet," but the mixture will do it good. Ten bushels as a spring dressing per acre, continued as long as beneficial, is my recommendation.

Mr. Fuller—If thistles are cut so as never to show a green leaf for three years, without regard to the moon, I think it will kill them; but no single cutting will do it.

A BARREN GRAPE VINE.

Philo Barnes, of Marion, he don't say what state, says he has a grape vine that blossoms every year, but bears no fruit, and wants to know what to do with it.

I answer. Prune it and feed it with bones. Bury around its roots all the bones now wasted about the house. The dissolved ones out of the soap-kettle will be first-rate.

Mr. Burgess.—I would recommend him to shake the branch of another vine in flower over the barren one.

A FRUITFUL VINE.

Mr. Provost exhibited a vine ten feet long with one hundred fine bunches of grapes. He said, I manure high every year, and then put a coat of sand over that. I don't know of any remedy for the barren grape-vine mentioned by Mr. Robinson.

STIFF CLAY SOIL—HOW TO AMELIORATE IT.

A letter from Charles M. Walker, of Lapeer, Mich., says:

"I have for a long time been a close and attentive reader of the debates in your Farmer's Club, which excite far more interest throughout the country, than you probably imagine; and I write now to ask for information, which may not only benefit me, but others. I have a piece of ground which I vainly tried to raise crops on last year, consisting of pure yellow clay. This spring I had it spaded over, the depth of the spade being twelve inches. It cut out like lead or putty, turning up in pieces the size and shape of the cut of the spade, and remaining just as they fell from it. There does not seem to be the least particle of alluvial or vegetable deposit—as I should call it—with the clay—nothing but pure clay. It has been dug up a week, and is as hard and unpromising as ever. Now, I wish you to tell me through the Farmer's Club, whether an application of lime would be good for it, and if so, how much to, say a half acre, and whether marl or stone lime is best. Also, whether tile draining would be good for it, and if so, how far apart the drains should be laid, and how deep?"

Solon Robinson.—Now I will answer this inquiry in part. I have seen 800 bushels of lime per acre applied to land of just such a character as he describes this, without materially improving its texture. I think the same quantity of coarse sand or gravel, or coal ashes, would do more good. Swamp muck, or any rich earth would be beneficial. It is difficult to drain such land, but it can be done with tiles not less than three feet deep, and not over thirty feet apart, and always open at both ends, so as to aerate the earth as well as to take off the water. In a stony country it would pay to dig up a small plot, three feet deep, and bury a course of stones a foot deep at the bottom, mixing ten per cent of any kind of vegetable all through the earth as it was thrown back. It would then be a good soil, and one that would last forever, with fair treatment.

Charles Merrill, of Malden, Mass., writes as follows:

"I have a garden for vegetables, say 12,000 superficial feet, on which I have applied three cords of tanner's refuse of hair, fleshings, bones and glue stock—perhaps, in all, three tuns of animal matter; also, 500 lbs. ground bones, 60 bushels ashes, 150 lbs. Peruvian guano, 60 bushels charcoal dust, and the excrements of a family of seven persons, with perhaps four cords of stable manure. Now, this has been applied during the last three years, and my garden is almost barren. The dwarf pear trees die; the currant bushes on the border follow after, and the vegetables are stunted and valueless. What shall be done for its cure? I have ignorantly filled the ground with a glut of nitrogenous manure, and want to know how to neutralize this excess of ammonia or salts. Can I obtain this by the salt and lime mixture? and if so, how? Can I restore the land by carting on a layer of muck? and how shall it be prepared? Dr. Dana, of the Muck Manual, advises carting off all the loam, and carting on new in its place; but this cannot be done, as loam cannot be had for money."

Mr. Meigs.—On a stiff clay, I recommended 300 cart loads of pure sand, well mixed in, that made a good garden out of a poor one.

Mr. Fuller.—A man near me, in Brooklyn, dosed his garden to death in a similar manner. His grape vines grew twenty feet in a season, but he could get no fruit. His strawberries were all leaves and vines, but no berries. A farmer who kept a lot of cows filled his land so full of their manure that it was worthless. I advised him to apply lime, and it brought it about again.

Mr. Pell.—I am yet to see ground too rich. I once manured a piece till I could grow nothing—from wheat to buckwheat. I then drained the land and sowed oats and got sixty bushels, and since, without manure, got good crops. There was a poison in the soil that killed the crops. Draining carried off the poison.

Prof. Nash.—I think that fifty loads of sand added to this Malden garden, and plowed shallow the first year, will cure the difficulty. So will planting corn a year or two, probably. I do not think the land in Malden absolutely needs drainage.

Mr. Pell.—I have never seen a piece of land that would not be benefited by draining.

Dr. Trimble suggests plowing that land deeper than ever before.

Mr. Van Houton.—I know a very fruitful apple tree in an old grave-yard, while an orchard alongside fails. Another apple tree, manured by a henroost, bears abundantly. A pear tree, excessively manured by night-soil, is now full of fruit. So is a tree standing in the richest spot I have on my farm. I take particular care of my trees, in enriching the land, and such make rapid growth and bear fruit, while trees upon poor ground will not produce fruit for use.

Mr. Fuller.—I did not advocate cultivating trees on very poor land. I only object to overfeeding.

THE ELEMENTS OF TREES, AND HOW TO MAKE HEALTHY ORCHARDS.

From a lengthy letter from L. M. Parsons, of Waukau, Wis., we make the following extract upon the benefit of shade and snow in producing the elements of trees, and particularly in keeping a young orchard in a healthy condition:

"Waukau, Wis., *April* 17, 1859.

"Hence the virtue of perennial life is due to processes which can only be carried on in conditions which exclude the light, like that of snow, rubbish or shade. Indeed, the tannin increment is almost limited to snow-clad districts; and perennials are the most abundantly supplied with it where the concealment of snow in winter is continued through the summer by the agency of moss, leaves and shade. Hence it would seem, that to perpetuate an old orchard, it should either be supplied with the perennial increment in solution, or that the ground should be so concealed from light as to secure a perpetual elaboration of that element.

"This view is supported by the dwarfed appearance of perennial plants throughout the prairie region of the west, where autumnal fires, from time unmeasured, have robbed the soil of every concealing object, thereby limiting the time of perennial gestation to the short period of shade afforded by cereal plants, and the quantity of perennial food to the simple want of cereal plants, wherewith to embalm their seeds. Hence young orchards on our richest cereal soils, like our scattered forest trees, are weak in fibre, false in heart, and early show the marks of dotage, and on which the undying parasite makes his preëmption before his time. Nothing is more fatal to prairie orchards than open culture, or blighting than the plow, and nothing more beneficial than straw, boards, or anything to make concealment. The soil of old orchards, however well supplied with the embalming element, in its virgin state, becomes exhausted by open culture, naked grazing, and usually deprived of shade by the unsocial distance of the trees, so that in the run of time the soil of eastern orchards, like western prairies, fails to do perennial service.

"Six years ago, I put out some nursery trees of three years growth, on prairie sod, digging the pits only three inches deep, with a drain, and covered the roots with soil from an old cultivated field, and having scattered potatoes over the ground, covered them with straw fifteen inches deep, putting a little dirt on the top to pack the straw, and some sawdust around each tree to protect it against mice. I had a good yield of potatoes, and every tree lived, and now have the spread of an old orchard, and give a good yield of fruit. One tree was set where there had been a hog pen; that tree has borne for five years the finest of fruit (though a seedling) to such extent that it has been necessary to support every limb, and it now measures fifteen inches around its body a foot above the ground. None of these trees have a blight upon them, while trees near by, treated in the usual way of open culture, have not over one-third the growth, and already show the mark of dotage, the yellow leaf, and the worm of time."

SALINE MANURES.

Mr. Pell.—Our subject for to-day is one of great importance to the Agricultural interest, as with lime, salt, ashes, &c., &c., we can change the character and constitution of our soils. Naturally each soil establishes upon itself a vegetation suited exactly to its nature, being governed by the substances in the soil, and if the growth is not suited to the taste of the farmer, he must, by artificial means, change the constitution of the land, and he has the power to alter at will its chemical and physical qualities, and compel it to grow other races of grasses than those which nature has implanted in it. Or if advisable, he may quadruple the abundance and luxuriance of the races it bears. In the production of changes such as these, rests the skill of the practical agriculturist. In the accomplishment of such great objects, he drains, plows, harrows, irrigates, limes, sands, clays, marls, manures, and compels it to produce whatever he desires. When he drains and ploughs, he changes the physical character of his land; when he limes and marls, the chemical constitution. If he finds the soil produces fine crops he may be assured that mechanical operations alone is all that will be required to retain it in fertility. If but one inorganic constituent is wanting, it will be comparatively speaking sterile, and no crop will succeed. And as I have introduced two classes of agricultural operations, I will ask permission to consider them both.

The mechanical modes of improving soil, are ploughing, harrowing, irrigating, mixing with clay, sand, marls, &c. The chemical modes include *lime*, vegetables, animal and mineral manures.

Clay soils are generally considered by farmers peculiarly adapted for wheat; loam soils for barley; sandy soils for oats; gravelly soils for rye, corn, &c. In sandy soils, contiguous to the sea, salt-loving plants abound, such as asparagus, &c. When these lands are drained, and subsoil ploughed, the rains wash out the excess of salt, and they become nutritive grass soils.

Sandy soils, remote from the sea, are distinguished for their growth of grasses, and these may be made to bear nutritive grasses by the addition of the decomposed saline plants from the soils in the neighborhood of the sea. On ordinary sandy soils leguminous plants rarely grow. By the addition of marl to such soils they immediately appear. If your land is sandy, and you observe the colt's-foot growing upon any portion of it, you may naturally infer that there is marl in the subsoil, which may be obtained by digging, and placed on the surface. On soils abounding in lime, couch-grass is rarely seen. Wherever it may be found, clay will generally form the subsoil, and this may be used advantageously as a top-dressing.

Peat soils yield a grass peculiar to them, known as the Holcus lanatus, which is soft, rich and luxuriant; lime frequently underlies them in the shell form. If this is dug and spread as a top-dressing, luxuriant crops will grow, and if clay is added to stiffen it, corn and potatoes will repay the expense.

Wherever you observe the water-cress growing in streams issuing from hill-sides, you may be assured that by digging you will find an abundance of marl, or lime. By using these as top-dressing great results may be obtained on contiguous lands. In fact, all farms have the proper manures upon them, if the owners have sufficient chemical knowledge to discover them. If you would know the chemical constitution of your soil, analyze that which grows best upon it.

All soils undergo slow but certain natural changes as time wears on; that is to say, stiff clays become after a period of cultivation, black vegetable mould, to a certain depth, produced by the decay of nourishing grasses.

The same changes take place in forests. Charlemagne was accustomed to chase the deer and follow the roe, in the forest of Gerardnier, then abounding with oaks, and it now only contains pines. On the river Rhine, I observed forests of oaks yielding to the beech, and in other places the beech yielding to pines. This is plainly indicated to the observing traveler, who, the moment he beholds the dead top of the dying beech, will see the living top and dark green foliage of some other tree, ready to take its place. When a forest of oak is cut down in our country, a pine forest succeeds it. If pine precedes, oak succeeds. This practical hint given us by nature, plainly shows that we must fit the crop to the soil, or change its nature to suit the crop.

Among the mechanical methods by which we produce changes in the soil, draining undoubtedly holds the very first and most important place, as without it no man need attempt to farm. Efficient drainage permits excess of rain falls to be carried off, and affords a ready escape for stagnant water, arrests the ascent of water from beneath, whether by the force of springs or capillary action, preserves the surface from undue moisture, and the sub and surface soil from noxious matters. It allows rain drops to filter through the soil, dissolve the gypsum, which requires much moisture, carry down top-dressings in solution, dissolve and carry off noxious substances, and open the way for atmospheric air to descend through the pores to the drains, thus refreshing the roots, and aerating their spongioles, besides drying, loosening, sweetening, and rendering friable the soil, hastening the growth of crops in the spring, making early the harvest in the fall, and in fact changing the climate in the vicinity, besides actually deepening the soil, and rendering it fit for that most important adjunct, the subsoil plough, which destroys insects and weeds, reduces the land to minute division, renders it pervious to the roots of corn, and permanent admission of air, by the oxygen of which animal life is sustained, and by its carbonic acid gas the plant is nurtured. When seeds are placed beyond its reach, they will remain for centuries without the signs of life, and still capable of sprouting when exposed to its vital influence. This accounts for new weeds, and for the growth of wild parsnips, of johnswort, and other similar pests, which appear; when by cultivation of the soil, the oxygen is permitted to reach the seeds, and they vivify them into life. Silicates insoluble in water are found by analysis in the leaves and stems of almost all plants. How do they get there? They are decomposed in the soil by the action of carbonic acid gas, which abstracts the potash from the silica, and forms carbonates of its base. These are carried down to enrich the soil by rain. Carbonic acid likewise decomposes felspar, the silicates of horneblende, and granitic rocks, all of which it converts into soil.

Having considered the mechanical constitution, and origin of soils, I will now take up the other portion of my subject, the chemical constitution of soils. They must perform four separate functions in reference to the growth of plants.

1. It must hold up and sustain the growing plant, by affording it a sure and strong position.

2. It must advance its growth towards maturity, by absorbing heat, air, and water for it.

3. It must keep the plant at all times thoroughly supplied with inorganic and organic food.

4. It must cause chemical changes to be constantly carried on, so as to prepare food requisite to be admitted into the roots of plants, and it is the business of the agriculturist so to improve the soil as to aid nature in the performance of these great works. And we must chemically improve our soils on the following principles.

1. That it must have in it a certain amount of organic food, and a variable quantity of nitrogen.

2. That inorganic food in many varieties must be contained in it.

3. That notwithstanding the different plants usually cultivated require different varieties of inorganic food, still, if it is in the ground, they will take it up in different proportions, and thus satisfy themselves.

4. That of one soil contains a large proportion of inorganic food, and another is deficient, we can meet the difficulty, by planting those seeds which require a large quantity in one, and those more easily satisfied with a small quantity in the other.

On the principles above named, hang the entire art of improving the soil chemically.

We have now reached a point that will enable me to take up and consider the mineral manures, saline and earthy. Among the saline may be named:

1. Carbonate of potash, which may be obtained in the crude form, or in the shape of pearlash, but at too high a price to use extensively for the cultivation of crops.

2. Carbonate of soda. This may be bought at a price that will enable all to use it to great advantage on grass lands, particularly if overrun with a mossy growth, or abounding in the poisonous sulphate of iron. It is applied advantageously in weak solution, by water-cart, or horse. I have

not been able to discover any difference, as far as growth was concerned, between it and carbonate of potash. Either are admirable for the growth and production of the strawberry, raspberry, grape, &c.

When using dry pearlash, I placed on a green crop of grass per acre, ... 200 lbs.
Carbonate of soda, ... 250
Common salt, ... 130
Gypsum, ... 128
Quick lime, ... 120
Epsom salts, ... 140
Bone dust, ... 200

The quantities given above will fully replace the inorganic matters taken from the earth by a crop, as indicated by analysis.

The theory of the action of potash and soda upon vegetation, is, that it yields to the plant a full supply of that which is at all times essential to its growth in a state of health and luxuriance. Potash is particularly advantageous to many plants raised for food, particularly to corn, potatoes, turnips; and soda will produce extraordinary effects upon buckwheat. Soda and potash render vegetable matters in the soil soluble, and then combine with them, in which state they are conveyed into the spongioles of the roots of plants. They also form soluble compounds with humic acid, and with many other matters that usually exist in the generality of soils. If you put a small quantity of soda or potash in milk, it will convert the sugar contained in it into the acid of milk. It probably produces similar changes in the sap of plants.

3. Sulphates of potash and soda, used upon ground will increase the production at least a quarter, and in some cases more. On fruit trees an admirable effect is produced. Sal-ammonia and nitrate of soda will much increase a crop of cereals, but the sulphates will produce the same effect, at a cheaper rate. One hundred weight of either of the salts per acre, is the smallest quantity that should be used.

4. Epsom salts will promote vegetation equal to either of the salts named, and if it could be obtained at a cheap rate, would be of great advantage to practical agriculture. It is only sold in crystals, and is too expensive for general use.

5. Sulphate of lime (gypsum) has for many years been applied advantageously to numerous crops in many countries. In Germany it is found to be particularly favorable upon grass fields generally, and in our country clover is peculiarly benefited, and it is used upon all crops. It requires a large portion of water to dissolve it, and consequently, as a top-dressing in dry seasons, it sometimes disappoints the farmer. I would recommend the use of it but once in four years, placed on the field when the leaves are well advanced.

Dilute sulphuric acid, placed on land through the medium of the water cart, exerts a similar influence on soil to that effected by the use of plaster, which contains sulphuric acid.

200 pounds of burned gypsum contains as much sulphuric acid as
252 pounds of unburned plaster.
256 pounds of sulphate of potash.
208 pounds dry sulphate of soda.
470 pounds sulphate of soda, crystallized.
360 pounds sulphate of magnesia, crystallized.

Sulphate of lime will benefit red clover much more than white. The red contains more lime and more potash than the white.

6. Nitrates of potash and soda. These two substances are very efficacious in agriculture. As the practical farmer well knows, they are abundant in nature, and when put on land increase the growth of plants, and add to the weight of hay and straw. It gives hay a fine flavor, which is eaten greedily by farm stock. It produces great tops on potatoes, but injures the growth of the tubers. If the land is rich, it becomes injurious by increasing the growth of straw at the expense of the grain. In all cases it increases the growth of the stem, and produces woody fibre to the injury of the crop. Therefore, never use these nitrates where there is a deficient nourishment to produce straw. Nitrate of soda will improve turnips five tons to the acre, by the application of one and a half hundred weight.

One acre of land, dressed with ten loads of stable manure, produced 25 cwt. of turnips. With fourteen bushels of bones and fourteen bushels of ashes, 29 cwt. of turnips. With one hundred weight of nitrate of soda, 80 cwt. of turnips.

On land out of condition these nitrates will invariably be found beneficial; on land in condition, rarely so. Whenever your plants are feeble and pining, dress them with nitrate of soda, and you will be astonished at their rapid recovery. The critical period in a plant's growth, as well as in an animal's, is at an early stage of its existence. Two hundred pounds of dry nitrate of soda contains thirty-five pounds of nitrogen, and nitrogen is an absolutely necessary constituent of plants, which they extract almost entirely from the soil.

Plants require for their proper development, a large supply of inorganic matters. Therefore the farmer is more apt to be successful in the raising of crops by the use of mixed manures, instead of depending upon any single substance, unless he knows through the medium of analysis, what the single matter required is. All barn-yard manures contain certain portions of saline matters, each of which specially affects the crops; consequently, the growth and production must be ascribed to the joint action of them all. Nitrate and sulphate of soda mixed together and applied to potatoes or grain, will produce a much better effect than either separately.

Wood ashes affect leguminous plants in a wonderful manner, particularly if applied in repeated doses of three or four bushels to the acre; but if in large quantities at a time, exhaustion of the soil takes place, unless it possesses a large quantity of vegetable or animal matter. Their immediate effect may be hastened by adding a small quantity of carbonate of soda, crude potash or salt to the dry ashes, because they contain imperfectly burned carbonaceous substances, in small or large quantities, the effect of which we cannot precisely estimate. These often amount to a large percentage of their weight, and consist of insoluble phosphates of potash, silicates, carbonates, magnesia, lime, &c. Ashes, when placed in heaps, sometimes take fire by spontaneous combustion, and become red hot. This occurrance has happened upon my farm, and consequently I always spread them at once upon the land, as sad accidents might occur.

There appears to be a great difference of opinion respecting the use of ashes. One farmer says: "By the application of ten bushels, I produced forty bushels of wheat to the acre;" and another says,—"I used the same quantity with very little result."

The reason is this:—The composition of different kinds of ashes is very dissimilar. For example, ashes from the pitch pine is much richer in soda and potash, and possesses less phosphoric acid and lime than that from the common white pine; while that made from beech wood is exceedingly rich in phosphoric and sulphuric acids, lime and potash. As they differ, so will differ their effects upon land. If you place a plant in the fire and burn it, the hydrogen, nitrogen, oxygen, and carbon are driven off, and the inorganic portion called the ash remains; and if this is again exposed to an intense heat, it suffers no diminution. The quantity and quality of the ash of two different species of plants, though grown upon precisely the same soil, is never alike; they differ in the ratio of their different affinities. The inorganic constituents contained in the ash are absolutely essential to the substance of plants, and if the farmer would have healthy crops he must supply them. The ash of a plant will clearly demonstrate what a soil ought to contain, and thus throw an unexpected light upon the operations of the agriculturist. The inorganic substances contained in different vegetables varies from one to fifteen per cent of their entire weight.

The weight of ash left by 100 lbs. of wheat is	2	per cent.
Barley,	3	"
Rye,	1½	"
Oats,	2¾	"
Barley straw,	5¾	"
Oat straw,	6	"
Rye straw,	3	"
Wheat straw,	3½	"

If a farmer finds one of his fields will not mature a certain crop, let him try another, and success will attend his experiment. If you plant a fruit tree, its roots immediately select from the soil the variety and quantity of inorganic matter which will mature its parts. You may graft another tree upon it, which requires the same variety of inorganic matter in like proportion. This will generally be the case with the same varieties, rarely with different species, and very seldom with a different genera. You may engraft upon an orange the lemon, because the sap of both contain the same saline and earthy substances, but the grape, or fig, would not ripen on the orange stock, because they require different substances from the ground, and such as the orange tree root would not extract. The sugar of the fig, tartaric acid of the grape, and citric acid of the lemon, are all different. If you plant a tree upon any soil, devoid of the substances the tree requires, it will inevitably die. So it invariably is in grafting or inoculating. It is indispensable that the sap of the stock should contain all that the scion requires in all stages of its growth.

Carbonate of Potash.—When trees are burned in the clearings of our country, the ash is washed and dried; this forms the potash of commerce; when this is dissolved in water, and boiled, pearlash is the result.

I find carbonate of potash a powerful assistant in the growth of plants. Ashes have been from the most remote antiquity, and are found in the sap of all plants, more in some than others. Wood ashes and quick lime when incorporated, form an admirable substance for dissolving and decomposing vegetable substances.

Sulphate of potash dissolved in 120 times its weight of water, acts very advantageously upon leguminous vegetation.

Nitrate of potash or saltpetre, exists and is constantly produced in many soils; the influence it exercises in the acceleration of the growth of plants is wonderful.

Citrates and tartrates of potash are found in many fruits; citrates in the lemon, tartrates in the grape, but they are not known in nature, except in living plants.

Chloride of sodium, or common sea salt, abounds in salt water, and in various incrustations on the surface, and in solid masses on the earth; it is found in the ashes of all plants, and is often borne with the spray immense distances inland. It has always been used to promote the advancement of vegetation, and whenever it fails to benefit the land, you may decide it is there in sufficient quantities.

Sulphate of soda, a glauber salt, is manufactured from common salt, by combining with it sulphuric acid in the presence of heat. This salt is found on all plants, and diffused more or less through all soils.

Phosphate of soda is very grateful to most plants. Carbonate of lime, nearly all lime stones, with carbonic acid gas, are varieties in different states of purity, and will all effervesce in dilute muriatic acid (spirit of salt), and may thus be readily distinguished from all other rocks. It is very valuable as a sustainer of vegetation.

Chloride of calcium is obtained by dissolving quick lime in muratic acid; it has a surprising effect upon potatoes, causing them to weigh several pounds. Corn manured with it will grow seventeen feet high, and its effect upon the sun-flower is amazing.

Sulphuret of calcium, is compounded of sulphur and calcium, and is admirably adapted to the growth of plants in which sulphur is found.

Bone earth, is a white substance that remains when bones are burned, and consists of phosphate of lime. It is the substance chosen in nature to give strength to animals. It is found in the seed of a great many plants, and in all grains cultivated for food by man. The ashes of plants are rich in it, and every particle of bone is well calculated to have a beneficial effect towards the support of the growing plant. They are more efficacious when reduced to powder, than when coarsely broken, and still better when placed in a heap, and allowed to ferment, as they are then well fitted to act at once on the growing plant. Still if so prepared, then usefulness on the succeeding crop is diminished. This earth exists more or less on all soils, as animals die everywhere over the globe, and their bones become covered and remain in readiness to form the necessary supplies. The reason the earth is so long able to retain them, is, that they are insoluble in water, or the solution of potash and soda. They are slightly soluble in organic acid, and carbonic acid, through the medium of which the phosphate probably enters the roots of plants.

Bones dissolved in dilute sulphuric acid and mixed with gypsum, largely diluted with water, form an admirable liquid manure for any and all plants, but most especially for cereals and grass.

Native phosphate of lime, or apatite, exists in many parts of the world abroad, as well as in this country, and generally in veins in the granitic and slate rocks. There is a vein in New Jersey, and another on the shores of Lake Champlain. When bones became dearer than they now are it may be used as a fertilizer.

Lime.—This substance has never been found in a perfectly pure state, but in combination with acids, principally carbonic acid. In this state it constitutes many varieties of limestone, chalk, marl, and marble. When in combination with sulphuric acid it forms gypsum, and with phosphoric acid, becomes a chief ingredient in bone. Quick-lime, whether in powder or dissolved in water, rapidly decomposes every vegetable substance, and is therefore injurious to vegetation, but combined with carbonic acid is an ingredient useful to all soils. In agriculture it is used with the view of rendering substances in the soil, suited to the growth of plants, and likewise for counteracting the evil effects of noxious matters, either rendering them harmless or useful.

Lime acts with great efficacy upon land previously manured, and will continue to produce crops so long as there is any nutritive matter in the soil, after which its use will deteriorate the land and diminish its value. Inert matters should always be in the land when lime is applied. For breaking up fresh, coarse land it is admirable, and it is strikingly advantageous when you desire to correct the defects of a subsoil. Lime rapidly returns to its original state by first absorbing water, when it becomes a hydrate, and then by absorbing carbonic acid gas, and is then admirable for the calcareous matter it contains. It may, therefore, justly be classed among those manures which promote the permanent fertility of the soil, for unless it is washed out by rain water, or moisture in the atmosphere, it cannot be removed from the soil except as the food of plants. In muck lands no manure can compare with it, either for rapid action or powerful effect, provided drainage has been attended to. The quantity applied to the acre must vary according to the quality of the soil. The larger the quantity of organic matter it contains, the more lime it will bear. It should never be applied without proper consideration, and then not in such large quantities as has been customary, as when land becomes lime sick, it will not produce good crops for several years. It must be considered a stimulant, and not a manure. Its effects are to give solidity to light soils, enabling them to retain moisture, and prevent the sun's rays from penetrating sufficiently far to dry up the roots.

If laid on the surface of grass land, it sinks immediately into the soil, until it reaches the subsoil, and there remains until recalled by the plough. It may be applied when the land is in fallow, and advantageously, if mixed with vegetable remains or salt. If mixed with dung it renders the extractive matter insoluble, and is therefore injurious. One hundred bushels to the acre on heavy land, and eighty on sandy land, may be considered moderate doses, though I have applied four hundred bushels on clay, and 200 on sand. Magnesian limes are sometimes injurious to land; therefore, I prefer the oyster shell, of which I have used several thousand bushels during the past winter. Lime is indispensable to the fertility of the soil.

Marl.—This substance presents various colors—yellow, white, blue, grey, and numerous degrees of coherence—fine, sandy, loose, clayey, and tenacious, according to the nature of the locality where it is found. The characteristic property of all marls is the presence of carbonate of lime in them. Its operation upon vegetation is like that of lime, but much slower in its effects, and if placed upon the land immediately on being taken from the pit, it is injurious in some cases, and not advantageous in any. The proper practice is to leave it in heaps for a year, and turn it several times. It will, if used in large quantities, produce beneficial results, by improving the texture of the soil mechanically.

They differ in composition, and consequently in the effects which they are capable of producing. The proportion of carbonate of lime is unlike in all varieties; phosphate of lime abounds in some, clay and sand in others.

Silicate of Lime.—This compound of lime occurs in nearly all soils in small quantities, but has not been used to improve land, even where it abounds. You will find a superior growth of vegetable productions in the vicinity of trap rocks, by the degradation of which silicate of lime is imparted to the soil. This is a valuable hint to those having farms in districts abounding with these rocks, or where iron smelting is carried on, as the slag that is obtained from the furnace consists chiefly of this admirable enricher, which, instead of being used for making highways durable, should be placed upon the contiguous farms, in a disintegrated state, and to a certain extent will be as effectual as caustic lime, besides imparting to the soil firmness, solidity, silica, and lime.

If I have consumed too much of your valuable time, please excuse me; but I could not say less about this most efficacious substance, lime, which, in the hands of a skillful agriculturist, is better calculated to ameliorate the condition of soil and increase its powers of production than any other substance known to me. Practical and theoretical men think they fully understand the varieties of lime, as well as the chemical principles upon which depends its influence, but I can assure them many dark clouds will have to be removed before our knowledge becomes complete. I am now going to my farm, where leisure will be allowed me to enquire, think, and make experiments, that may assist to remove the mist which now hovers over this and numerous other branches of agricultural chemistry, particularly the wonderful connection which is well known to exist between geology and agriculture, and if any satisfactory light gratifies my exertions, the Farmers' Club shall reap the benefit.

Mr. Fuller exhibited noxious weeds, Canada thistles, mullens, chickweed, oxeye-daisey, couch-grass, which drive useful grasses off the field, and sorrel; *all of them foreigners, imported from time to time.*

Mr. Provoost, in answer to questions, How he manured his vineyard? replied, with night-soil and *plenty of pure sand!*

Mr. Meigs.—Prof. Mapes has long stated the rationale of the sand. As a *mechanical divisor*, roots easily make their way through it, and *every grain of sand* becomes coated with organic manure, which the spongioles take off with facility very suitable to their beautiful character,—spongioles resembling the *ever moist* points of rootlets,—each grain of sand yields up its organic coat to their suckers. The rootlets which appear at the foot of our Indian corn, when they approach the ground, begin to drop water on the spot which they mean to enter. In that way, like the moist nose of a dog, they soften the ground that they may easily penetrate it, and so also do our *common earth worms!*

Mr. C. H. Lilienthall exhibited a lemon, of twelve inches circumferance, one of many an one tree in his conservatory, on the bank of the Hudson river, where he has expended about two hundred thousand dollars on about fifty acres of land, conservatories, &c.

Mr. Doughty, of New Jersey, has given the club some corn, grown from Mexican corn by him, in Jersey. It is a handsome, white, pearly grain.

Subjects for next meeting, "Noxious Weeds; origin, spread, and how to be rid of them," and "Injurious Insects."

Club adjourned. HENRY MEIGS, *Secretary.*

May 30, 1859.

Mr. William Lawton, of New Rochelle, in the chair.

Mr. Meigs read the following translations and extracts, made by him since last meeting, viz:

[Revue Horticole, Paris, April, 1859.]

GARDENIA CITRIODORA.

The genus Gardenia is composed of shrubs and trees, originally from Asia and tropical Africa, and Cape of Good Hope. We have a large number of its species in our conservatories. The above named, is one of the most beautiful of them. Hooker introduced it from Port Natal, about five years ago. It was first cultivated in the gardens of Chelsea. It is small, not over two feet high. Leaves opposite elliptic, lanceolate, deep green, thick bunches of flowers at foot of every leaf stalk. Flowers pure white; perfume, mixed of orange and jasmine. Flowers early and keeps till summer. They require constant warmth and frequent watering, are easily multiplied by cuttings.

VALERIAN.

The leaves, about fifteen of them, bound on a bad cut in the thumb, healed it in five or six days completely. I examined the plant in the Jardins des Plantes, and found it to be the *Valeriana Phu. Note by Meigs.*—That was so called by Dioscorides, who lived in the time of Nero.

WINES OF EL PASSO.

Northerly part of Chihuahua, bordering on the Rio Grande del Norte—a beautiful, well watered valley, light, sandy loam, yielding enormous crops of crops. One of them resembling our Isabella in size, but not in flavour—blue color. Another delicate white grape, small compact bunches—resembles Muscatel. Most wine made from the blue one, of large bunches, with round plump berries. They pick off some bunches, and also some leaves, to let in the sun. By incessant pruning, the vines become stocky—eight or ten feet apart. When ripe, the whole space seems almost a solid mass of bunches. The streams which irrigate the vineyards are called Aceynias.

[California Farmer, April 29, 1859.]

CHUFA OR EATH ALMOND

Has become interesting here for man and beast. There is oil in them. They should be cultivated.

STRAWBERRIES.

Mr Kelsey has fifty acres, Messrs. Lathams twenty acres, at Oakland.

NEW REAPER AND NEW PLOUGH.

Cornelius R. Brinckerhoff, of Batavia, Genesee Co., exhibited models of his patent reaper and plough.

The reaper has cut 26½ acres of wheat, in 11½ hours, with two horses and two men, followed by four men to bind sheaves. The implements cuts and gathers in regular close parcels, ready for binding. It is hardly liable to get out of order.

The plough has a subsoil plough attached, which is set to any required depth. A strong team can therefore complete the work at one operation, instead of as formerly, two distinct ploughings, thus a saving of *half the time*, a very important fact, especially to farmers.

The Club seemed to be highly pleased with both, reaper and plough.

Solon Robinson.—This is a good improvement, but not patentable, because it has been in use in Virginia for ten years. It was first invented and used at Norfolk.

NATIVE FLOWERING SHRUBS.

Andrew S. Fuller mentioned a variety of native shrubs that are well worth cultivation for their beautiful flowers. The Avenum pennafolium is one of these.

Mr. Pardee.—The rhododendron is a very beautiful flowering shrub. They will grow in shady spots, and cannot bear hot sunny places. The soil should be sand and leaf mould. There is a great variety of this plant, and they are easily cultivated. The American varieties are the handsomest.

THE CHUFA.

Mr. Fuller.—I hope the subject of the Chufa will not be dropped. It is easily grown here, and is very sweet and rich and possesses great fattening properties. If planted a foot apart, the nuts will fill the ground full. It will yield more than corn per acre, and is easily cultivated. The seed is hard to keep—it won't bear the least frost. I consder it one of the most valuable plants lately introduced into cultivation.

LAWN GRASS.

R. G. Pardee spoke of the new plant for lawns—the Spergula, which is an evergreen, spurry or Spergula, growing short and close—which is so much admired in England.

Mr. Thurbur remarked that the Chicken weed of this country belongs to the same family as the Spergula.

Mr. Pardee.—The value of this new lawn plant is that it is so evergreen and grows very short and fine, and never needs cutting.

THE CURCULIO.

Dr. Trimble produced specimens of the curculio and its work. The gnarly apples are produced by the sting of the curculio. The peculiar crescent-shaped mark is visible, and this produces the knotty, rough appearance that you see in those apples of last year. Many of the stung apples fall, and are lost. Others grow to maturity, but not perfection. If you watch the sting in favorite plums, and cut it out at once, you may save the fruit. The cut will not spoil the plum; the insect will. This insect is the great pest of fruit-growers, and I believe is the cause of the black knot in plum and cherry trees.

Solon Robinson.—Here is a letter from Samuel R. Eells of Forrest Grove, Bucks County, Pa., upon this subject, that comes apropos to this discussion. He says:

"I notice that at your last meeting, the ravages of the curculio on fruit trees was discussed. I have never seen or heard of a remedy that was effectual in destroying them; but we have a kind of plum tree here that are never affected with them, although they may be standing side by side with other varieties that are covered with the knots, and as I feel desirous of communicating whatever may be of advantage to the fruit growing community, I have taken the liberty of herewith giving you a description of the kind of fruit, thinking that perhaps they were unknown in your section of the country. They are very large blue plum, flavored like a Green gage, and are very great bearers, so much that in the wet seasons they must be frequently shaken, to prevent them from rotting, as they set almost as thick as onions on straw bunches; and again they are a natural fruit, and are either propagated by the stone, or from the sprouts that spring from the roots. They are called here the Richland plum, from, I suppose, their originating in Richland township, in this county. My trees are loaded this year with them, so much so, I am fearful of their breaking down."

Mr. Pardee.—I do not attach any importance to this letter, because I have seen just such things before as here described. When the curculio first began its ravages, some trees were exempt in the same way. A man in Connecticut, preserved his plums last year by sprinkling the trees with a manurial compound. Air-slaked lime has sometimes preserved the fruit.

Mr. Fuller.—The Golden Cherry-plum is exempt from curculio, while they can find anything better to feed upon.

Mr. Pardee.—I suggest experiments with compounds of liquid manure. The black knot will destroy trees if let alone, but if vigorously pruned off as fast as the knots begin to appear, the disease may be cured. I have thus saved a Green gage in the very midst of a knot-infested district. Cut off the limbs as soon as the sting-holes are visible. I do not think the curculio makes the black knot—it is some other insect. The holes are like pin-holes, and each one contains an egg, and afterward a maggot.

Dr. Trimble.—I believe the black knot comes from the curculio—the same insect that stings the plum. I have hatched out, under glass, the curculio from the limb that had been stung, so as to produce the knot. The rot of plums spoken of by the letter from Pennsylvania, is occasioned by the same insect.

Mr. Gore of New Jesey.—I once saved my quinces with a mixture of calcined gypsum and chappel salts. The latter is a manurial substance manufactured at Baltimore. I don't know the proportion, as the mixture was accidental, but it was a dose for the curculio.

Mr. Pardee.—I cannot believe the curculio and black knot have any connection. I don't know of any horticulturist that does believe it. I hope experiments will be tried.

Mr. Fuller.—I hope then that they will be carefully tried, so as to be sure.

NOXIOUS WEEDS AND PLANTS.

This, one of the questions set down for discussion to-day, was called, and Andrew S. Fuller, a practical horticulturist, who has made himself familiar with weeds, was called upon to exhibit and describe several specimens which he had placed upon the table. He said:

The most troublesome weeds that we have to contend with in Brooklyn, are the "Triticum Repens, or Quack-Grass" perennial. It has long, wiry roots that penetrate almost any kind of soil. The only sure method of exterminating it, is to dig it up and burn it. There is one good quality—it will live and thrive where other varieties would soon perish. Cattle are fond of it, and in barren lands, where other grasses would not thrive, this might be used with profit. Where any other variety will grow, keep this out.

"Cirsium Arvensis, (Cnicus of the old Botanist) Canada Thistle, Perennial. We have but little trouble with this plant on Long Island, but in some parts of the country, it is the greatest pest known among plants. The root passes so deep in the soil that the plow does not reach it, therefore it is very difficult to eradicate it with ordinary means. A great variety of ways have been recommended to destroy it. Very few of them are of any practical use. Salt or potash will kill it, if applied in large quantities, and the soil will be benefited in after years by the application. If the soil is cultivated for two or three years in succession with hard crops, and the plant is not allowed to bring its leaves in contact with light and air, it will certainly perish. This is the cheapest and most practical method of exterminating this pest of the farm that we know of. If your neighbors allow their plants to produce seed, your labor will be in vain. There are several other varieties of thistle in this vicinity which are somewhat troublesome, but, as they are only *biennial*, they are easily got rid of if we do not allow them to produce seed.

"Leucanthemum Vulgare,"—Oxeye Daisy—Perennial. This is another great pest, and when it gets into grass lands it will spread until it gets entire possession. It produces an immense quantity of seed, which the wind scatters to a great distance. It is easily destroyed by thorough plowing or hoeing.

"Rumex Acetosella"—Field Sorrel—Perennial. This plant seems to thrive best on light loamy soils that are deficient in lime. A good application of lime scattered on the plant in wet weather will in most cases destroy it. When it once gets its roots in among garden plants or among grass in light soils, it takes thorough and severe means to exterminate it.

The "May Weed," a very common plant in all the country, is another pest of all the farmers of the Eastern States, though it does not infest the fields as much as it does the road sides, and yards, and lots about the house and farm buildings.

Asclepias (from Æsculapius) horned, and nigra, and here is another pest, smilax rotundifolia.

The "Milk weed," so common in all rich fence rows, is a pest, but not very bad among crops. It is a great blot upon the good looks of a farm, and its light seeds are very easily wafted over the fields by the wind. These are only a few of the pests called weeds.

Now, what we want is, how to eradicate these pests: all our labor at this season is devoted to extirpating weeds. This list embraces only a small portion of them; their name is legion.

The Chairman.—As to eradicating these noxious weeds, it can only be done by changing the crops. A change of manuring will always produce a change in the growth of weeds. I get rid of daisies by sending men into the field to pull all out by the roots.

Mr. Pardee.—The most important thing that can be said about weeds, is not to sow the seeds. I would never use barn-yard manure until composted, and the vitality of seeds destroyed.

Mr. Fuller.—I suppose it won't do to say that weeds come spontaneously, yet these pests come wherever the white man goes. It is almost impossible to prepare manure so as to kill all the seed of weeds.

Mr. Burgess, a practical gardener, said he did not believe the weed seeds could be kept out of gardens if they were fenced with cloth forty feet high. He continually observed some new weed coming in to take the place of any that might be extirpated.

Solon Robinson.—We shall always be cursed with weeds while we maintain that miserable system that formed another branch of our subject that was to have been discussed to-day. I allude to farm fences. They are the very nurseries of weeds, particularly the old stone walls. It is the pest of fences that maintains the pest of weeds.

Mr. Fuller recommended strongly, to all gardeners and farmers, the faithful reading of Dr. Darlington's work on botany. It is in compact form—plain and sound.

Mr. Lawton remarked that when we plant a higher order of plants, they extirpate the lower order.

The subject of fences at next meeting will necessarily include "Stall feeding."

The Club adjourned to Monday next.

H. MEIGS, *Secretary*.

June 6, 1859.

Present, forty-two members. Mr. Pardee in the chair.

Mr. Meigs read his translation as follows:

[Journal de la Société Impériale et Centrale d'Horticulture. Paris, 1859.]

BEST VARIETIES OF RHUBARB.

The English gardeners have cultivated rhubarb, and ameliorated it greaty, so that it has become one of the most agreeable and wholesome legumes of our modern gardens. It is largely used in England, and in many portions of Germany, and will spread over Europe.

Mons. de Spreckelsen observes that the *petioles* (foot stalk of leaves) partake of both *vegetable and fruit*, and come before the summer fruits and vegetables. The surest method of deciding their good quality is their redness,—the best being deepest colored. The length of the stalk is of much less importance. The best variety now known, the *Neue Aromatische*, or *Nouvelle Aromatique—New Aromatic rhubarb*, has the shortest leaf stalks, and has the advantage of coming about a fortnight later than the Myatt's Linnæus, Mitchell's Royal Albert, &c., so that it is good to eat in summer, when the others have become hard and woody.

AMERICAN RHODODENDRONS AND ROSES—BY JOHN STANDISH, LONDON.

He comprehends Kalmias and Azaleas, which also are native there. He thinks the best place to grow them is in a moist subsoil, or in spots where the earth can be raised so as to *shed water* to their roots.

HOW TO RAISE VERY LARGE ONIONS.

From the "Illustrirte Gartenzeitung" of Oct., 1858.

Choose in Autumn the best,—put them in a suitable bag, and keep them all winter suspended alongside of a stove (*poêle*), where a fire is kept every day, or nearly so. They almost entirely dry up before spring, when you plant them in good suitable soil. They will give leaves and hardly any stalk, but the bulbs will weigh nearly a *pound and an half*, and *often more.*

HOW TO PRESERVE STICKS FOR PLANTS.

Take 50 parts of resin; 40 parts of chalk, pulverized; 300 parts white sand; 4 parts of oil of linseed; 1 part of red oxyde of copper; 1 part of sulphuric acid; *mix and shake well.* Heat it to paint the bottoms of the sticks; if it should be too thick, add the more oil. It dries quick, and becomes as hard as stone. It answers for boxes, or any wood which is to bear wet.

A NEW PEAR.—*Huyshe's Bergamot.*

Mr. Huyshe, of Clythesdon Rectory, Collumpton, Hants, has obtained it from the seed of the Marie Louise pear, by fecundating that with the Gansel Bergamot. The new pear is as large as the parents, but more resembles the Marie. It is a very fine fruit. The skin is lightly colored a fine brownish cinnamon. It is commonly fit to eat by Christmas. The tree very productive. The pear is about nine centimetres long, and eight round, or 3⅝ inches by three inches and nearly two-eighths.

Mr. Bruce called for the reading of the following papers, viz:

THE ELDER BUSH.—VALUABLE HINT.

It is known to many persons that the common elder bush of our country is a great safeguard to plants against the devastation of bugs. If any one will notice, it will be found that worms, flies, bugs, or insects never touch the elder. This fact was the initial point of an Englishman in 1795, and he communicated the result of his experiments to the Londen Magazine. Accident exhumed this old work, and a Kentucky correspondent last year communicated to the *Dollar Newspaper* a copy of the article. The practical result of the experiments, as asserted by the English experimenter, are, that the leaves of the elder, scattered over cabbages, cucumbers, squashes, and other plants subject to the ravages of insects, effectually shields them. The plum, and other fruits subject to the ravages of insects, may be saved by placing upon the branches and through the tree bunches of elder leaves.

CURIOUS MODE OF BUDDING.

M. B. B. Redding has in his garden a peach tree, on which he has succeeded in making one branch grow into another, by the process of budding. The object is, where the tree has more than one trunk, to keep them from splitting under the weight of an abundant crop. A regular system of interlacing can thus be attained, and the branches made to support each other, without requiring props, as are not unfrequently resorted to, in order to save trees.—*Sac. Standard.*

TREATMENT OF HENS.

Two flocks of hens were compared. One laid eggs almost all the time; the other laid scarcely any. On examining their treatment, the following differences were found to exist; the former had a warm cellar to roost in during the winter; the latter roosted in a stable where the wind blew in. The former had a fine place in an open cellar for scratching among ashes, lime and earth; the latter scratched in the manure heap, or in the stable when the cows were put out. The former had plenty of good water, with milk, &c.; the others had no drink except what they could find.—*Rural American.*

Mr. Fuller.—The Red Stalk rhubarb, mentioned by Spreckelsen, as the best in Europe, is by no means the best here, nor has it the advantage over ours as to the lateness of its utility in summer. Our large, quick-grown stalks are superior in tenderness and delicacy. Some ignorant persons peel off the skin, not knowing that the flavor resides in the skin, as is the case with some fruits.

Rev. Dr. Adamson remarked that it became very delicate by excluding light, as with sea kale. Its cellular structure contains a gum, &c.

Mr. Burgess, an old English gardener, said that he placed sticks all round a plant, which favored its growth.

Mr. Lawton.—The Linnæus and Victoria are both excellent varieties. I get 15 cents a bunch (four stalks making a bunch) in market. The Linnæus requires less sugar than most other varieties.

Mr. Fuller.—I can get rhubarb to grow early or late, just as I cultivate it. This Cahoon seed gives large, saleable stalks earlier in the season than any other that I have ever seen.

Mr. Burgess replied that it was practiced in England, and it much improved the quality. The stalks should never be peeled before cooking. I think the red stalks the best.

Mr. Fuller.—The red is all a notion. The red sells the best in market, and that is all the advantage it has.

Mr. Lawton.—Some of the varieties cultivated a few years ago were very inferior to the sorts now common. It is a great advantage to dig around and manure the plants in the fall, and again in the spring.

Prof. Renwick.—My brother raised rhubarb for pies some 35 years ago, but discontinued it after the orchard began to afford apples.

The Chairman.—I have seen very fine plants only fifteen months from the seed. I think, generally, seed from good varieties will produce good seedlings, if not the original.

Mr. Burgess.—I raised 50 seedling plants from the Victoria without getting a single good plant. I have seen four stalks weigh twenty-eight pounds.

Solon Robinson.—I have a word to say about wine from rhubarb stalks. I stated here some months ago, when I produced a bottle of wine made at Kenosha, Wis., from Cahoon's seedling, that an acre would give 800 gallons of wine as good as the sample, which was pronounced very good sherry.. I was, Mr. Cahoon assures me, mistaken in the quantity. He says it will make 2,500 gallons per acre. The juice is mixed with equal quantities of water, and three and one-half pounds of sugar to a gallon, and barreled and fined and bottled in the usual way of making wine from any other substance.

Apropos of this subject, here is a letter from F. W. Evans, one of the leading elders of the New Lebanon Shaker society, who says:

In return for the many items of useful information that I have gathered from the reports of the Farmers' Club of your city, I am inclined to present a few facts from my own experience.

Rule for Budding—uniformly successful in the most critical cases and kinds. Cut the scions when either the first or second growth is completed, and just at the time when the terminal bud that forms on the end of the twig is handsomely browned. If the tree to be operated upon be in precisely the same condition, and the manipulation is all right, it is impossible for it to fail; as at that time or state, the sap is in its most glutinous condition, while on the contrary, when the tree is growing the most rapidly, the sap is the most thin and watery. I have budded many of the common red cherry stock with entire success, and have had them in full bearing every year, except the present, wherein the cherry blossom buds, in this section, were all killed during the winter. They form a valuable tree for fruit; they bear early and constantly, and the trees never injure; but those worked upon the common English stocks are subject to sun blight, the bark killing down on the south side.

Transplanting.—If the tree be of much size, in addition to the usual good rules given in books, wrap the tree with twisted straw. Reason: When a tree is newly set out, the roots cannot gather and send up the usual supply of sap to counteract the action of the sun and wind, always intent upon seasoning wood of every description; consequently the sap vessels become contracted in size, so that when the roots have become rooted, and are prepared to meet all demands upon them from their friends the branches, the latter cannot receive it, and the tree becomes stunted or killed. The straw prevents this seasoning process; and by retaining the moisture—preventing evaporation—the size of the sap vessels remains undiminished; and when the roots get matters arranged, the growth proceeds just as though nothing had happened.

I have tried with success the following remedy for restoring the sap vessels when they had by neglect thus become too small: Pour boiling hot water upon the twisted straw. This will swell them out again, and restore an apparently dead tree to life.

Mr. Burgess recommended covering the trees with a mixture of lime and clay as very beneficial to prevent the sun drying them up when transplanted.

Mr. Fuller.—I am totally opposed to daubing trees with anything. I would as soon daub a sick man as a sick tree.

T. W. Field.—Still we bury our trees to keep them moist, and that acts the same as coating them with clay.

Mr. Fuller.—Not at all. The effect is very different; in one case we want to retard growth, and in the other induce it. I believe in wrapping the straw around.

R. G. Pardee.—In cities, where straw may not be convenient, some old Manilla matting will answer a good purpose, or any old waste straw sacking from the groceries, cut up in suitable strips.

CANADA THISTLES.

Solon Robinson.—Here is a letter from a Mr. Goodsell, of Lawrence, Ill., in proof of what I have asserted here about the difficulty of eradicating the Canada thistle in such a soil as that of the prairies.

At first he found only three or four stalks, the product of one seed sown with grass. He says:

I at once commenced an attack, by spading the earth to the depth of a foot or more, and taking up at least two feet square, and carefully handling the earth so dug up until I was sure there was not a root left that could be discovered, but two or three weeks showed me that the enemy was not dead for it sprouted not only in the portion spaded, but also the young shoots appeared outside of the spading. Again I pursued the same course, and again they appeared, until, in the course of the three following months, I dug the ground over five or six times, and extended it to ten or twelve feet square. I conquered at last, and to this day am happy to say my premises are free of the vile weed.

STRAWBERRIES.

R. G. Pardee exhibited a basket of very large and beautiful strawberries, from George S. Schofield's garden on Staten Island. The Peabody was very large, but Mr. Pardee says he does not like it as well as the Wilson seedling.

John G. Bergen also showed some very fine specimens of Wilson's seedlings, and several others. The crimson cone is the one most common in market, and is very prolific.

T. W. Field also exhibited some fine Wilson's and Iowas, and other varieties. The latter is thought much of at Cincinnati as a market berry. It is hard to say which is the best variety for all purposes.

Doct. Trimble exhibited several varieties, among which was the Bayden seedling. It is of high flavor, but a rather shy bearer. The Iowa, he said, with me is very productive. The Peabody is a shy bearer. The Boston pine is the finest flavored of all.

Mr. Bergen thought the Wilson seedling the most prolific of any variety yet introduced. It is rather acid until fully ripe. It is admirably adapted to growing in stools, as it enlarges and strengthens the original stool.

T. W. Field.—I have a good many stools with over 100 berries. The plants sold as Wilsons are often false. For making vines run and increase plants, they should be treated with stimulating manure, and not permitted to bear fruit while making new plants.

The specimens exhibited were generally such as would do credit to any fruit show, but not in large quantities enough to gratify the members with tasting. A good many women were present, and appeared much interested. The question was further discussed.

Mr. Burgess.—The Black Prince originated in Scotland, as an accidental seedling in the field. I recommend every one who sees a good field-berry to bring it home and cultivate it.

Prof. Renwick.—The best strawbery I ever tasted, grew at West Point. It was a wild plant, brought to the garden and cultivated.

Wm. Lawton.—The white Alpine was a wild berry, and very much esteemed in former years.

Mr. Fuller.—I don't think that you would eat them now that we have Wilson's seedling, Hovey's, Hooker's, Peabody's, and all the other fine varieties.

KYANIZING WOOD.

R. G. Pardee.—I have lately seen stakes in a garden at Hudson, that have been in the ground twelve years, and are perfectly sound. The process is as follows: One pound of blue vitriol to twenty quarts of water, and for such sized things as shingles two days soaking will do. For posts six inches square, soak ten days. No cask will answer. The gentleman, Mr. Fairfield of Hudson, who gave me the information, uses a box that he can key up as fast as it shrinks. Kyanizing has long been practiced in Europe. Mr. Fairfield stated, that the French kyanize all the wood of their navy, and it is even made to enter standing trees.

Prof. Renwick.—The practice of charging standing trees, is for the purpose of changing the color of the wood. The tree is girdled and a tank of the liquid formed around the cut, and it rises and changes the wood. No iron vessel will answer to hold the liquid used for kyanizing, as it corrodes and destroys the iron. It is not necessary wholly to immerse timber in the tank. Inserting one end will answer.

A CHEAP BAROMETER.

Solon Robinson exhibited to the Club, specimens of a barometer lately invented by Victor Beaumont, of this city, which is likely to prove of importance to the agricultural community, because it is cheap, costing only

$5, and as effective as the most expensive kind, and not likely to get out of order, and can be transported as easily as a watch, with as little danger of injury. It is made to hang up on the wall of the house, and occupies but little space, not more than a large apple, and it would undoubtedly pay every farmer back its cost every month in the year; and the cost, which has prevented so many buying from a barometer, is now entirely within the reach of any one disposed to have such a useful implement about the house.

Mrs. Chapman presented peas, which, she stated, grow very large and very fine. These have a light blueish color, and are much shrivelled.

Subject for next meeting, "Strawberries, Roses, and Fences.

The Club adjourned to next Monday.

H. MEIGS, *Secretary.*

June 18, 1859.

Present, 100 members. Rev. D. Campbell in the chair.

The Secretary read the following translations, &c., made by him:

[Journale de la Société Impériale et Centrale. Paris, 1859.]

Minutes.—The sitting, as always, opened at 2 o'clock P. M.

Mons. Payen in the chair.

Earthen ware tickets, to attach to plants, exhibited.

Insects attacking the heart of the strawberry stem—sometimes the leaves and flowers—causing considerable damage, were exhibited. They are the *Cétoine stictique*, a small species of Lamellicorne, found almost everywhere among us, especially about dung heaps.

The Secretary General lamented the decease of Madame Loudon, a corresponding member, and justly celebrated for her important horticultural publications.

Mons. Dumas has seen the immediate effect of the Insecticide powder of the chamomile, *Pyrethrum willemot.* All perish promptly where it is spread. It is now well cultivated for insect killing.

Fragaria lucidæ, transparent strawberry, has been introduced into England by the celebrated horticulturist, M. E. Van Houtte. It is thought that it may become valuable by means of fecundation from a good strawberry.

SEEDS OF FRUIT TREES.

[From the "Hamburger Garten und Blumenzeitung." March, 1859.]

In the Congress of German Pomologists and Grape-growers, at Wiesbaden, last October, among many other questions treated, that of seeds of trees was considered. Nuts of fruit, and seeds especially, hardly preserve their vitality more than from two to four years, unless kept in a very dry and *cool* place. It is, however, best always to plant fresh seed. In the Congress the following mode was much insisted on: That is, a trench of planks, paved at bottom with bricks, leaving holes for surplus water to pass off; put in best soil, but *no fresh dung*. Sow the nuts about 5½ inches deep, and the seeds about 1¼ inches deep. The trench should hold about eight or nine inches depth of earth. Cover the whole with an iron net, with meshes so small that mice cannot get in. All agreed that this sowing was best done in autumn.

INFLUENCE OF THE MOON ON VEGETATION—A VULGAR ERROR.

At a recent meeting of the Club, the influence of the moon on vegetation was mentioned, and placed among the obsolete notions of mankind. Science repudiates it utterly.

I now find in the May number of the *Revue Horticole*, of Paris, the following article:

"The spring rains retarded our vegetation, together with white frosts on the 17th and 18th of April. The red moon accompanying the bad weather *certainement* had nothing to do with it. The moon looked on our bad weather. We wish to eradicate, if possible, from the souls of our gardeners those rooted whims, which to them have become *Articles of Faith!*"

The majority of our farmers and gardeners are so confident of the influence of the moon—new or at the full—for planting, that they frequently lose largely in their products by it, For instance, *garlic*, which we use so much in the kitchen, they say will be larger if planted at new or full moon, and produce five or six times *more lobes*. That beans, peas, potatoes, planted at new moon, will grow more vigorously; that a still better crop comes if seed be planted at full moon. A great many have more faith in the power of the moon *than that of the atmosphere*.

We now repeat, that the experience of Quintinus, and, above all, of Duhamel de Monceaux, proved beyond all question that the moon had no appreciable influence on vegetation. The experiments of Mons. Chanvalon, in the island of Martinique, shows that there is no perceptible difference between the plantings at any phase of the moon. Our late illustrious friend, Mons. Arago, examined this question, and has stated (in his fine notice thereof), fully, that this influence is imaginary altogether. He gave us a couple of aphorisms as follows:

"Do you want your cabbage and your lettuce to grow well, make double flowers; Your trees give early fruit? Sow, plant, prune in the *decrease of the moon*.

"Do you want your plants and trees to grow well and vigorously? Sow, plant, graft and prune in the *increase of the moon*.

According to Mons. Auguste de Saint Hilaire, they say in Brazil:

"Plant your carrots, potatoes, and some other vegetables in the *decrease of the moon*, but sugar cane, corn, rice and beans in the *increase*."

Pliny said, some 1700 years ago, "Plant beans at full moon and lentils at new moon."

SYNOPSIS.

PLACE.	INCREASE.	DECREASE.
Europe, Arago,	Branches of trees.	Cabbage, Lettuce, early fruit.
South of France,	Garlic.	Root crop, Beans, Peas.
Italy, Pliny,	Lentils.	Beans.
Brazil,	Corn, Beans, Sugar Cane.	Roots, &c.

So that in different places absolutely contrary influence is ascribed to the moon. At the opposition (full moon) and the conjunction (new moon), at positions differing in distance 80,000 leagues.

The long habit of observing the seasons of seed time and harvest has connected the moon with it, although the fair satellite has no more power then than ever winter. The moon was our first almanac; they were governed by it, but it really had no more power than our present *penny almanac* has. The real influences are heat, cold, rain, sunlight, winds. These are what our farmers and gardeners should study.

HEDGES.

Mr. Reid, of Clarion, Pennsylvania, wrote for information relative to Hedges, particularly Thorn.

I have written to him that we make good and beautiful hedges out of our native rose bushes in Texas, sweet, beautiful and good. That hawthorn, one of the best of the sixty kinds of thorn, yields abundant seed, which should be planted, and when grown high enough the plants of a size, as nearly as possible, should be set. I advised that all weeds be kept out, and a fence made to defend the hedge until it is strong enough to defend itself. That care! care! will do it as well as every thing else—*best.* That when done it is for a long time. That it is beautiful. That the warmth of well hedged fields is higher than those inclosed by open post and rail fence. That hedges protect some crops from fierce storms far better than the post and rail, &c.

I would add, that if the birds, who love to build their nests in hedges, were duly encouraged, they would do more good in clearing out crops of noxious insects.

[Revue Horticole, Paris, May, 1859.]

THE MARKETS OF PARIS.

Railroads have vastly extended our supplies. Instead of the market gardens around Paris, we receive from afar. We wish to tell those at a distance what our rules are. We have carrots, turnips, parsnips, leeks, radishes, onions, sold in bunches of about two and a half pounds weight; sorrel, spinach, parsley and chervil sold in what are called haynets, of about the same weight; mushrooms are sold in little baskets of five to eight mushrooms of average size; those from a distance sell by weight. Large vegetables, such as cabbages, cauliflowers, artichokes, and sometimes celery, sell by the hundred.

THE MOON INFLUENCE.

Mr. Tillman.—If the light of the moon is such as to photograph itself through a telescope in six seconds, it must have some influence upon vegetation.

John G. Bergen.—I don't see the connection of this—that the moon should have any influence. My father kept a diary two years, making careful experiments as a market gardener, and found that the moon had no effect whatever upon vegetation. If I understand the position, the effect is upon the plant in a growing state, and not upon the seed. So it is of no practical value.

Mr. Burgess.—It is well known in England that plants, particularly under glass, grow the most when the moon gives the most light.

Wm. R. Prince.—There is, in my opinion, but one thing that the moon has an influence upon. That is very soft pates. They get moon-struck.

John G. Bergen.—A brother of mine was sure that storms were not so likely to occur at full moons, but by thirteen months' careful experiments, he found that he was in error, and gave up that moon theory.

STRAWBERRIES.

A very high degree of interest was manifested in the splendid exhibition of strawberries—the finest that has ever been made by this club.

Wm. R. Prince exhibited twenty-six varieties, all of which he originated but three.

Mr. Prince made his exhibition in glass cases, the fruit upon plates, in a very neat manner, and during his remarks exhibited them in his hand, giving interesting descriptions. He remarked, as a general thing, large strawberries are not so high flavored as smaller varieties. In regard to hermaphrodite plants, he said they never can be large bearers. In female plants, every flower produces fruit. Wilson's Albany is a staminate, and a large producer. The Ladies' Pine originated in Canada, and is the highest flavored of all the varieties. The Fragrant Scarlet is also remarkable for its high perfume.

Dr. Habel, of Westchester county, exhibited several seedlings, of remarkable size, of his own production; some 5¼ inches in circumference.

Moses H. Grinnell sent in specemens of the Bicton strawberry, and also the Black Prince, of great beauty and large sizes.

Andrew S. Fuller exhibited some fine Peabody seedlings, and said that he admired them much.

Wm. S. Carpenter exhibited Chorlton's seedling, a light-colored, very high-flavored and melting fruit, some 4½ inches around.

Orange Judd exhibited Ward's seedling, a very fine berry. It is a plant that Dr. Ward, of Jersey, found on his place, and cultivated it.

R. G. Pardee showed Trollope's Seedling, a high-flavored fruit, but not a prolific bearer.

Native or Wild Strawberries.—Solon Robinson.—Now, gentlemen, if you are all through with your improved varieties, I will redeem my promise, made at the last meeting, and show you where you started from. I also wish to produce a practical argument to some persons who have stated here that the cultivation and increase of seedlings has not improved the quality of strawberries. Here is a basket of the original wild-growing fruit, just a fair average, as it comes from the fields. Look at it, smell of it, taste of it, contrast the two together, and say which you would prefer; and don't forget the back-ache you must endure to pick a basket full of these little wild berries out of the grass.

This part of the exhibition added much to its interest, and was particularly instructive.

Proportion of Kinds.—Mr. Cumming.—Where I have one Hovey, which I consider No. 2 of all, I have ten Wilson's, and fifty of Wilson's to one of Peabody's; and that is about the proportion of their production.

Dr. Trimble.—I think the Wilson seedling a very acid sort.

Mr. Cumming.—Then put in the sugar and you will have the perfection of fruit.

Orange Judd.—I have tried thirty varieties of strawberries this morning, and am yet undecided which is the best variety to plant. The Wilson is so acid that I would not cultivate it.

John G. Bergen.—Out of a great variety tried at my house lately, by a large company, the Wilson was preferred above all others. It is a berry that turns red before it is ripe, and care must be taken not to pick them until fully ripe, and then, with me, they are not more acid than others. Mr Bergen exhibited 18 sorts, the most of them unnamed, and some of them of very handsome appearance.

Wm. R. Prince gave an interesting statement of the origin of all our strawberries, and stated as a fact that those of Europe and this country will not hybridize together.

After his remarks, he requested his berries to be distributed, and the club was at once resolved into a general tasting committee, and for a time there was a pleasing scene of high satisfaction. A vote was then taken as to what was the opinion of those present as to the six best varieties for family cultivation. The following are named in the order of their numbers as in the appreciation of a majority of those who voted upon the question as the best: No. 1, Wilson's Seedling: No. 2, Longworth Prolific; No. 3, Prince's Le Baron. At this stage of the question, some little excitement began to manifest itself, lest the particular favorites of particular individuals should not be named, and one man, who has a continual vision before his eyes of "an ax to grind," and sort of fear that in some way he might be called upon to turn, seemed anxious to postpone the subject. A discussion followed.

Mr. Prince.—There is a difficulty in this kind of voting, since some who vote may never have eaten any of the first class.

Mr. Huntsman.—I do not think the Peabody a good berry for cultivation, though high-flavored. It must be grown altogether in stools, as it runs much to vines and leaves. The Wilson overbears, and lacks foliage, and it is likely to die out from overbearing.

Mr. Judd objected to this manner of naming the six best varieties out of so many, all excellent. Such a loose way of promiscuous voting would not settle anything, and would bring the Farmers' Club into disrepute.

R. G. Pardee.—I agree that this is a rather loose way of determining a question; but perhaps it will be expected that we should express some opinion. If there is any better way of getting at it, I shall be happy to agree with that proposition.

Solon Robinson.—I will name that better way. Let this question be continued till next meeting, which shall be next Monday, and appoint a committee of five now, who shall take the matter under advisement, and report to the Club next Monday their opinion, and then we will agree with it or not, just as we like.

This proposition was agreed to, and the following named gentlemen appointed as the *Strawberry Committee:* S. W. Huntsman, A. P. Cumings, R. G. Pardee, Dr. Knight, John G. Bergen.

ROSES AND FLOWERS.

This was one of the subjects fixed upon for discussion, but there was no time for it, and it was, with the other subjects of this day, continued till the next, and a fine collection of roses, peonies, &c., brought in by Mr. Prince, and others, were distributed, very much to the satisfaction of the large number of women present, who, although not taking part in the discussions, added great interest to the meeting, which was the largest and most interesting we have had in the new rooms.

Mr. Meigs.—I cultivated a Chili strawberry many years ago. Middling size, figure more like a large raspberry, pale flesh-color, exceedingly fine flavor. I covered the beds with the refuse sweepings of the bark, dirt, and little chips of a winter's wood pile. The crop was profuse.

Mr. Huntsman.—The cross between *South* American and English strawberries is good. Yet our *North* American will not cross with the English strawberry, according to Mr. Prince.

Mr. Meigs availed himself of the occasion to remind members of the high eminence of horticulture, by adverting to the history of the *Prince Garden, at Flushing.* In the time of the grandfather of our present Prince, the British army having defeated our army in the battle of Long Island, marched to Flushing under General Howe, and on the 29th of August, 1777, two days after the battle, the General *stationed a guard for the protection of the garden.* That Prince was a lineal descendant of the celebrated Thomas Prince, who was Governor of Plymouth Colony for eighteen years, after 1621. The garden was called the "Linnæan Botanic Garden."

So much for the honor of a garden! The same army passed over to New York, and converted *the church* (now our Post Office) *into a circus, tore away all the pews, and galloped about inside!*

In 1776, the Prince garden contained full grown fruit trees, of which no less than *thirty thousand* were of the English grafted cherry.

Next subject, "Summer Fruits and Flowers."

H. MEIGS, *Secretary.*

June 20, 1859.

Peter Cooper in the chair. Present, 60 members.

The Secretary read the following extracts from works last received by the American Institute, viz: Gardeners' Monthly and Horticultural Advertiser, Philadelphia, June, 1859.

STRAWBERRY.

"Mr. Downer, of Kentucky, a most skillful and reliable Horticulturist has produced a new berry which is pronounced a *triumph!* on comparison with *celebrated kinds.*"

GOOSEBERRY.

"A mountain seedling gooseberry, brought into notice by Philemon Stewart, of the United Society at New Lebanon—a rampant grower, monstrous bearer, perfectly hardy, and never mildews!

Fungus in your propagating beds is killed by slight sprinkling of salt on the tan.

PLUM TREES.

Salt good to kill curculio, but must not be placed too near the roots. Plum is naturally a marine tree, and it is surprising how much salt it will assimilate and thrive upon.

CURCULIO AGAIN.

Dip bunches of rags in gas tar and hang them in the plum trees, and renew occasionally; found to be quite effectual.

Solon Robinson.—Mr. C. Taber, of The American Agriculturist office, sends a bag of seed for distribution, with the following note:

"Seed from E. Nash, of Auburn, N. Y., who says he has sown twelve acres of it. He calls it 'Chinese buckwheat.' It is also called 'Italian buckwheat, 'Italian Bloom Grass,' &c. It is evidently a species of millet, nearly resembling the Canary seed. It is said that over seven tons of fodder was cut from two acres of it last year."

Jas. H. Parsons, of Allegany, N. Y., sends the following:

"*Query for the American Institute.*—The late frost in this section has done great injury to the trees, killing the foliage of many *entirely*, together with the new growth and the young buds. Will such trees put out new buds this year, or will they remain leafless two years?"

The chairman replied that he knew of the same thing forty years ago, yet the trees recuperated again.

Andrew S. Fuller—There is no doubt the trees will recover and put out new buds. If they do not they will die.

Solon Robinson read a letter from Mr. Parsons, with a sample of wheat to show how it was killed by the frost. He says:

"The farmers in this region say that winter wheat on low ground is killed. I send you in an old paper several stems of wheat, which I cut off with my knife, near the roots. There are four acres in the lot, and the wheat is fast turning white. The stalks are so badly injured at the joints that they cannot head out. I do not think there will be a peck of wheat in the whole four acres. A farmer living back on the hill says his under-wheat is about half killed. It is said spring wheat is not materially affected. One piece of rye which I have seen looks as if it had been destroyed by hail. The stems froze near the joints and then wilted, and the heads have fallen down to the ground. You can form some opinion of the degree of cold here, when it is stated that water in an iron kettle two inches deep froze solid, though water in tubs of a considerable quantity froze about a quarter of an inch."

A. P. Cumings—The probability is that the cause of this freezing and killing is the extreme rank growth of the plants this year. The stalk being full of juice and rank growth, was killed much easier than it would have been with equally hard frost, if the spring had been cold. The plants then would have been more hardy.

Here is a letter from D. D. W. C. Thorp, of Preston, Chenango county, N. Y., who writes upon the subject discussed here at a former meeting as follows:

"*Weeds.*—I have ceased to regard weeds as enemies, but rather as helps and monitors to stir up the soil on plowed land and keep it light and porous, for I am satisfied the roots of plants need a portion of air as much as the leaves. As to weeds on meadow land, they are sentinels that tell us the land wants better tillage—not to spend our time in digging up the weeds, or pulling them up, but to put on the manure—put on the manure, plaster, ashes, leached ashes, barn-yard manure, where we can; turn the street wash on to them, and if the grass is too thin sow on some grass seed. I think this method much better than plowing up and seeding over. I have a meadow of an acre and a half; when I bought it, nine years ago, about one-third of it was all white daisies. I put on the manure; they soon disappeared. Then it cut about one and a half tons; this year I think it will cut four tons. Last September I put on 500 pounds of plaster; this spring a dozen one-horse wagon loads of manure and five bushels of ashes, and there is no room for any weeds as I can see. White daisies cut in the blow make the best kind of hay, but it is not profitable to raise them, for you can't get over 500 or 600 to the acre. I like them sprinkled in with the grass, and where the grass is good they will not blow till the grass is ready to cut; for my experience, (I am 40 years old) is that the time to cut clover and herds-grass for cattle is when it is in its full blossom, but for horses herds-grass should stand till it has shed its pollen, which is ascertained by striking the head when the dew is on, and if no dust flies out then down with it. Canada thistles I don't think are pests, but good fertilizers, making a deep soil and enriching it every year by renovating the sub-soil. You can kill them in one or two years in any meadow by making the ground rich and mowing them with the grass. Get them to grow large stalks; they will be hollow; then mow them and they soon die out, but while they live they do not interfere with any growing crop, but I think increase it. When folks cut their grain with a sickle and bound and threshed by hand, they were in the way, but in these days of Buckeye mowing machines, steam plows, and thrashers, we ought not to talk much about exterminating thistles."

Bugs on Plants and Vines.—Mr. Robinson read further from the same letter, an inquiry what to do to get rid of the small brown bugs, about the size of a pin head, which have made their appearance this year, and feed upon all sorts of vines, cabbage, beets, tomatoes, &c. They are as nimble as flees, and will jump as far. The striped bugs I can manage, but these new pests I cannot.

John G. Bergen, of Long Island—Those bugs are not new with us; they are old enemies. They are called black jacks. With us Scotch snuff is the usual remedy. They are very destructive to plants while young. The best remedy for the striped bug is to plant seeds enough to feed the bugs. Let them eat part of the plants while the others grow.

A. P. Cumings—If you will cut your vine leaves and scatter wood ashes, it will keep them off. If the bugs get on the under side, that must also be covered with ashes.

Mr. Bergen—The striped bug is most troublesome in small gardens. Mr. J. Van Brunt, now present, has twelve acres of cucumbers growing at this time—say 20,000 hills. Of course he could never ash all his plants. His remedy is to plant early and get a good start, and then plant more seed in the same hill at a later period, so that the bugs could have young plants to eat while the older ones grow and get too big for the bugs.

Andrew S. Fuller—I have kept off the striped bug with whale oil soap. Onions have been recommended; but they are of no account.

Wm. Richardson, of Albany, stated that a gardener kept off the bugs by a little piece of paper--say six inches long—tied to a stake, and stuck in the hill and left to flutter over the plants.

Dr. Crowel.—The little black bug is kept off by salting the soil. Cabbages will bear any amount of salt. The striped bug is kept off by dusting the plants with any dry dust as well as with ashes.

Mr. Bergen.—A board box, a few inches high, will keep off the striped bug.

Dr. Trimble.—Some of these bugs lie dormant many years. The cockchafer is three years under ground.

Wm. R. Prince.—I should like to know what proof there is of insects lying dormant for years. I believe that all insects come to life when the revivifyng principle affects the egg or the seed.

THE STRAWBERRY QUESTION.

This subject was again introduced, and the following report of the committee appointed at the last meeting was read and adopted, after a long discussion:

New York, *June* 13, 1859.

Report of the Committee of five, upon the six best kinds of Strawberries to cultivate for family use.—The committee appointed at the last meeting of the Farmers' Club, to recommend six varieties of strawberries for garden culture, beg leave to make the following report:

In the opinion of your committee the following points should be embraced in a perfect strawberry: 1st. Productiveness. 2d. Large fruit. 3d. Vigorous plants. 4th. High flavor. 5th. Firm and juicy flesh. 6th. Bright color. 7th. Regular and symmetrical form. 8th. Calyx easily separated. 9th. Fruit borne on long foot-stalks. It is not maintained that any strawberry has yet been produced combining all these qualities in a high degree; but it is well to keep a high ideal before the mind. Your committee think it expedient to make their selections from varieties generally known, and such as can be procured of any respectable nurseryman, leaving the consideration of new varieties for some other occasion. It is, therefore, very probable that a better selection might be made by embracing some of the recently produced seedlings. Your committee accordingly recommend, provisionally, the following kinds:

1. Wilson's Albany. Its primary good qualities are productiveness, size, and firm, juicy flesh. It is, however, too *acid* for the taste of many.

2. Longworth's Prolific. Early, large, and of excellent flavor; only moderately productive; sometimes running too much to leaf.

3. Hooker's Seedling. Good size; of a rich, sweet flavor; moderately productive (some say very productive.)

4. McAvoy's Superior. Productive, large, and of excellent flavor; berries often defective in form.

5. Hovey's Seedling. This variety is too well known to need any description. Its only defect is dryness and want of high flavor.

6. Burns' New Prize. Of exquisite flavor; medium size; only moderately productive; plants want vigor and hardiness.

In presenting these, we have endeavored to state briefly their main points of excellence, and also their defects. On behalf of the committee.

G. W. HUNTSMEN, *Chairman.*

Wm. R. Prince followed the reading of the report with a severe denunciation of nearly all the sorts recommended, particularly the Wilson Seedling, which he called by a great many hard names. His lengthy remarks were listened to with attention, and some of them with profit; and a very animated discussion followed, of which we can only give the briefest synopsis.

Dr. Crowell.—I moved the adoption of this report because it so exactly corresponds with my views. This selection was made for garden culture. and not in fields for market. There is an objection to the Wilson Seedling, yet I think it the best ever introduced for family use.

Wm. Richardson, of Albany, who made a large and very handsome exhibition of the Wilson Seedling, replied to Mr. Prince's objections to this variety, by showing the immense productiveness, by the stalks or berries of one plant, or stools from it, enough to make a quart of berries. He also replied to the objection to the color, by showing the berries just as he picks them from two acres—two rows are set three feet apart, and cultivated by a horse and cultivator, similar to corn or potatoes. The production will be not less than 200 bushels per acre.

Wm. R. Prince replied to the gentlemen who advocate the Wilson Seedling by again making most bitter denunciations of, and declaring it about the worst of all the varieties ever introduced.

Dr. Knight.—I have a word to say as one of the committee. If not a grower of berries, I have devoted six years of my life to investigating this subject, and testing them at many horticultural exhibitions.

Mr. Fuller.—As to productiveness, I think there are several varieties as productive as the Wilson; but it is very sour. Prince's magnate is very productive upon plants three years old; but I do not like its quality. As to judging strawberries, you must see and taste them every day. Perhaps the berry of this collection that you would call the worst would prove the best.

R. G. Pardee.—We did not make up our minds from what we saw here. We have been accustomed to grow, to see, to taste, and carefully prove the quality of strawberries for ten years past, and we think we were qualified to judge something of the quality and value of this kind of fruit.

The subject was further discussed, and then the report almost unanimously adopted.

Edwin Marshall, of Poughkeepsie, said of Wilson's Seedling, that he thought it would give general satisfaction on account of its great productiveness, if it is a little sour. He also said of other sorts: The Crimson Cone is the great market berry of this city. The McAvoy extra red, which is condemned by some, gives me satisfaction, with sugar and cream. The Genesee is a very beautiful, good berry, and of good flavor. The Jenny Seedling is a good bearer, but acid. The Swanson Seedling is one of the very best-flavored berries, but the plants are very tender. The Hovey Seedling gives very general satisfaction; and, with the Early Scarlet for a fertilizer, gives general satisfaction. The Pennsylvania is a very handsome berry, and with me is quite productive and of high flavor. The Moyamensing is a good bearer, but not a very choice variety. The Hooker Seedling is a good berry, but not a great bearer. The Black Prince is a very handsome berry, and of fair quality. The Peabody is a very shy bearer, but a high-flavored fruit, and will be a favorite with families, but not for field culture.

Mr. Meigs reminded the club that the report of the committee on six best strawberries was declared by them to be merely provisional; of course subject to all proper alteration.

Mr. Prince said that his garden never sold any fruit; they gave it away. He has now two acres of strawberries, and the ground they occupy is worth $5,000 an acre. They sell plants, trees, &c., only.

Mr. Prince distributed among the ladies a large basket of his finest flowers. He said, with reference to the report of the committee, that he had, to some extent, treated it as he always does matters of that sort. His life-experience in the garden justified him; that nevertheless he would now vote for its adoption. And on motion it was adopted.

Same subject next meeting. H. MEIGS, *Secretary.*

June 27, 1859.

President Renwick in the chair. Present, 70 members.

The Secretary read the following extracts and translations made by him from the last articles received by the Institute from home and abroad, since the last meeting, viz:

La Belle-de-Nuit. The Night Beauty. According to M. Salesse, of the Emulation Society of the Aire, we ought to cultivate, on a great scale, this Night Beauty, the *Mirabilis Jalapa*, of Linnæus. (Mistake. It should be *Tournefort's.*) M. Salesse believes that it can be made to distinguish itself among the nutritious table vegetables. But we find this indicated in the Repertory of useful plants of M. Duchesne, in 1836, viz: "The seeds contain the proper starch for men and animals." And M. Salesse, on analysis, shows it to contain:

Very pure starch,	70
Extractive matter,	18
Fibrous, glutinous matter,	12
	100

Lindley says it belongs to the order Nyctaginaceæ-Nyctagos.

[Royal Society of Literature, London. April 27, 1859.]

Sir I. Boileau demonstrated that in very early times English wool was in high repute on the continent of Europe, and he proved from various Spanish writers, chiefly from Gomez Cibda Real, that there was formerly in Spain a *Judge of Shepherds*, usually a man of high rank. That in 1339, Migo Lopez di Orosco was the judge. That then flocks of sheep were brought in transport ships *from England to Spain!*

In 1465, Edward Fourth gave license "for certaine Cottswold sheep to be transported and sent into the country of Spaine, as a present to the King of Arragon." This sending away sheep was then unpopular in England. It was said that "those Rams and Ewes did so multiply in Spain as to have proved very detrimental to the woolen trade of England."

[London Farmers' Magazine, June, 1859.]

AUSTRIA,

Of about 140,500,000 acres, has now:

Forest,	44,500,000	acres.
Pasture,	22,000,000	"
Meadow and garden,	20,000,000	"
Arable land,	52,000,000	"
Vineyard,	1,740,000	"
Olive, laurel and chesnut ground,	155,000	"

Products in 1851.

Wheat,	67,679,000	bushels.
Rye,	99,000,000	"
Barley,	74,600,000	"

Oats,	131,567,000	bushels.
Indian corn,	56,000,000	"
Rice,	1,500,000	"
Other grain,	17,000,000	"
Pulse,	11,000,000	"
Potatoes,	142,500,000	"
Wine,	622,500,000	gallons.
Tobacco,	845,507	cwt.
Flax and hemp,	8,098,000	"
Linseed,	579,253	"
Hops,	72,599	"
Olive and seed oil,	647,258	"
Wool,	444,568	"
Horses,	3,230,000	
Mules and asses,	116,210	
Bulls and oxen,	3,795,348	
Cows,	6,615,136	
Sheep,	16,801,545	
Goats,	2,275,900	
Swine,	7,401,300	

Beets used in making sugar, five millions of *centuers*, of 123½ lbs. each, 117,500,000 lbs. She imports grain, and wool, and flax, and live stock! Austria ought to export.

WILSON'S SEEDLING STRAWBERRY.

The Southern Homestead, of Nashville, Tennessee, June, 1859, says; At a recent meeting of the Mississippi Valley Horticultural Society, at St. Louis, *Wilson's Albany Seedling Staminate* has sustained its reputation nobly. But no one sort can give as much satisfaction as half a dozen, if only for protracting the season. The Albany berry is a very large, dark, firm berry, not of first rate flavor, but *wonderfully productive.* An admirable Market Berry!

[Revue Horticole. Paris, May, 1859.]

Horticulture is every day making new conquests. It advances by little and little, and with patience, but each step gives us a definite result. In a brief article in the Journal of the Society of Horticulture of the Department of the Moselle, M. Belhomme has remarked on the great care required in the amelioration of certain species now spread everywhere, and that we never should despair of success in our efforts to improve plants. The carrot, parsnip, celery, carried from Europe to Central America, have required seven, nine and even twelve years culture there before they become as good as they were when first planted. It is believed that the *Bulbous chervil*, of same family with parsley, carrot, parsnip, skirret, called "Anthriscus-Cerefolium,"—formerly used as a pot-herb,—can, by culture, have its now small bulb made as large as carrot or parsnip.

Linnæus called it "*Chærophyllum bulborum.*" It is expected to become a very useful member of our root crops.

Doctor Sacc says that the "*Lappa Edulis,*" of Siebold, may furnish forage and a very good root,—that as a table vegetable the Japanese are very fond of it. Lindley puts it among the Asteraceæ, (Chamomiles) as the bardana or burdocks. This eatable lappa is a much larger growth than most of the family. The leaves are very tender, of a very lively, beautiful green; its double flowers purple; is a biennial. Flowers in July, go to thousands of gray seeds as large as those of turnsole. The seed must be gathered as soon as ripe, and sowed immediately, on account of the larvæ of a large coleopter having deposited its eggs at the base of the flowers. The growth is very rapid, so that by October the leaves are as large as your hand, and the roots as large as a quill. It should not be sown broadcast, for it needs hoeing, &c. The plants should be some seven inches apart. The root is rather difficult to dig, for it runs down more than three feet, and is tender; two fingers thick, and weigh six or eight ounces each. Cooked they are very wholesome, and taste something like the artichoke. The root grows much as the dioscorea batata does in depth. Cold does not injure the root. For forage it has that advantage in dry soil. Its top is cut three times a year.

Henderson, of London, proposes *Spergula*, Spurry, for grass plots (the *Spergula pilifera*, of Candolle). Its roots run deep, and therefore the leaves resist drought. It makes a very fine turf of a beautiful green, and in July is covered with great quantities of small white flowers. The seeds are very small—are sown in pots, &c., in shade. They are transplanted (the young plants) into larger pots, and lastly to the plot, in bunches of two or three plants, some ten inches apart or more. These will soon make one uniform carpet, which does not require mowing ever.

Lachaume has improved Spinach wonderfully. He sows English seed in nursery in August, transplants and waters them very carefully. In October he pulls off the leaves. Next May, at a time when Spinach generally goes to seed, this yields remarkable leaves. Four of them weighed half a pound, and measured fourteen inches in breadth, and from eleven inches to fifteen inches long, and the taste of it delicious. Gardeners should grow this, as saving labor in the gathering as well as quality.

We planted laurels around the tomb of Humboldt, who died on the 6th. He was one of the most glorious men of the age. Ninety years devoted to science, greatly in botany. The beautiful Cassia, of South America, has received his name.

J. S. Titus, of Flushing, Long Island, exhibited his patent double mould board plough, for cultivation of corn, potatoes, or other crops having space between rows wide enough for a horse.

Members asked whether it is to hill the corn.

Solon Robinson.—That is an operation that I specially object to; it is about the worst practice that ever prevailed to hill up anything.

Wm. R. Prince.—I fully corroborate that opinion. The practice originated in the damp soil and climate of England, where it was necessary to lift the plants above the level.

The President remarked that it was the same kind of implements in general use in Flanders.

Mr. Meigs had long ago remarked the beautiful arrangement in very large corn stalks, to throw out two or three rows of braces from joints nearest the ground, each brace having a spongy point always wet, and as it nears the earth drops water on the spot it wishes to penetrate, in order to soften it and so facilitate its penetration, which it soon does, and becomes nearly as strong as rattan; bears a great strain. When the surface is level the hold of it is great. Not so, of course, in a hill. I used to make the hills for planting *dishing*, so that when hoed the land would become level.

A letter of inquiry as to the proper name of the plant called "Dielitra Spetabilis."

Wm. R. Prince.—The name of Dielitra is an error—it is Di-cly-tra, but the proper name for the plant is Dicentra.

What constitutes a good cow? R. S. Sampson, of Leroy, N. Y., under date June 15, makes the following answer:

Within the last seven days I have milked from an ordinary sized cow 430 pounds of good rich milk, averaging over 61 pounds per day. The most given in any one day was 67½ pounds. If any one can beat this, I would like to know it.

An improved milkpan, called Pratt's Patent Self-ventilating Pan, was shown. It has a cover, with wire-gauze covered holes to ventilate the milk, and, at the same time, keep out the insects.

Mr. Arthur, of Philadelphia, exhibited this new milk pan, and stated that by means of the circulation of air through the minute seive-holes, there was considerably more cream made. That, as it was a new thing, he would supply all who wished to try it with pans, and ask for their opinion after full trial. Meat, butter, &c., keep well in the pans.

CORN AND COB MEAL.

Solon Robinson read a letter from L. B. Gould, of Jersey City, which, after speaking of the information he derived from the discussions of the Club, asks the opinion of its members in regard to cob meal. He says: "Is there nutriment enough in a whole cart-load of corn cobs to put one pound of pork upon a fattening hog?" For one, said Mr. R., I answer—not because I know, for who knows—but because I guess that the nutriment of corn cobs is about equal to the nutriment of rye straw, and that is not a profitable food for swine, and I don't believe it is nutricious enough for any animal to pay for grinding the cobs.

THE GINSENG TRADE.

A letter from D. P. Phelps, of Toledo, Ohio, giving some account of the extent of the ginseng trade in Wisconsin, says it is the most lively of all branches of trade in Richland county, Wis., amounting to $10,000 last year, and will probably reach $80,000 this year. The price is ten cents a pound green, and forty-two cents dry. In Minnesota the trade is equally lively. But here is the gist of Mr. Phelps' letter, which I hope some one can answer:

Now, then, if as is alleged, China and Japan afford a reliable and unfailing market for this intrinsically valueless and harmless root, at such rates as these, why can't it be cultivated profitably? Two hundred dollars a ton for the green root is a price which it seems to me should invite some experiments. Will you ask the Farmers' Club to ventilate the question, and issue its "vemilion (ginseng) edict" on the subject.

Mr. Robinson said: My first impression is that it is so peculiarly a wild plant, growing in thick shade and rich woods mold, that it would not bear field culture. Who can answer—and also whether the market has any stability? There was a time once, since the settlement of America, in which a great ginseng fever raged, but the Chinese got their fill, the market failed, and merchants were ruined.

Wm. R. Prince.—Mr. Belknap, of Wall street, made an experiment some years ago in garden culture, but I have never heard of any great success. I have grown it in gardens. There was a time, it is said, when it sold in China for its weight in gold. It is a plant of simple habits, and I don't know why it can not be cultivated.

The President.—The Chinese trade failed as soon as the Chinese discovered that the American and Tartarian ginseng were different.

KYANIZING.

R. G. Pardee presented a letter and a specimen of a kyanizing stake from J. W. Fairfield, of Hudson. It has been in the ground nine years, and is perfectly sound. It was kyanized by blue vitriol, one pound to twenty quarts of water, soaked three or four days.

ON PRESERVING WOOD.

Mr. Fairchild's letter to Mr. Pardee:

HUDSON, *June* 14, 1859.

On reading your remarks at the Institute last week respecting my experiment of preserving wood, &c., I forthwith resolved to write you. I have delayed till this day, when it occurred to me that I might best "post you up" with a stake. I went to my garden and found all my stakes in use. One standing by a firebrush now strong enough to stand alone I thought could best be spared. I took it to the block (most martyrs prefer the block to the stake—but I prefer the stake in this instance) and sawed off what I send you. I found *rot* in a spot that greatly puzzled me at first, and I concluded not to send it, but on reflection I became satisfied that this rot must have been in the stake when made. They were all made from the refuse strips in a carpenter's shop, in the fall of 1850. The point I send you has been in the ground, summer and winter, since the spring of 1851. The scarfing or pointing has never been changed since made in 1850.

You are familiar, I presume, with the history of "kyanizing," so called. Mr. Kyan first discovered in England the process of preserving wood, cordage, &c., by corrosive sublimate. This was so expensive that only wealthy corporations, and parties employing large vats, could use it. The prominent idea was that the albumen of the wood was combined by affinity with the sublimate. A French chemist suggested blue vitriol, as having a similar or greater affinity for albumen. On that suggestion I acted. Chloride of zinc is equally good—1 pound to 20 pounds of water. I have a wooden cistern under my barn prepared in the same way, every part of it. I have spruce posts now in the ground over two years, so prepared. My clothes-lines and twines exhibit, so far, similar results.

I speak of the chemical affinities above from recollection only. I have Kyan's book, but have not looked at it for years. This process by vitriol is called, I see, by some parties, "Burnetizing."

Yours truly, J. W. FAIRFIELD.

THE STRAWBERRY QUESTION.

This was introduced by Wm. Richardson, who made a show of the berries mentioned in the following letter. It is called the *Austin Strawberry*, and is an accidental seedling, originating in the Shaker Society:

The Austin Seedling Strawberry is cultivated by the Society of Shakers, at Watervliet, near Albany, and was produced from seed about four years since, and is a very large and hardy plant; very prolific; bush and stems high and strong; in full bearing about the 25th of June; a large proportion of the berries measuring from 4 to 5⅜ inches, and weighing from 1 to 1¼ oz.

The specimen of fruit presented grew from plants set last August on poor sandy soil, and not the largest berries gathered this season.

Yours, &c., CHAUNCEY MILLER, *Trustee.*

Mr. Richardson fully corroborated this statement.

Strawberry Growing in Illinois.—Solon Robinson.—Samuel Edwards, who writes from "The Evergreens, La Moile county, Illinois," thus states his experience:

I commenced cultivating them on the prairie in 1845. I have tried over forty of the recommended varieties.

The Necked Pine is the hardiest yet thoroughly tested; it is the berry to plant by the acre here. Have had them an inch and one-fourth in diameter, and of quality good enough to sell at wholesale in Chicago for 31 cents per quart.

They have never failed to bear a good crop until this year; the frosts of the 4th and 5th insts. killed them entirely, except where protected by trees in the orchard. My recommendations are:

Always, if possible, plant on new ground; use no manure, as it induces a rank growth of vines, with no fruit. Rows three and a half feet apart, plants a foot to eighteen inches apart; cultivate as corn first season; the plants will cover the ground for the second year, when a moderate crop of very fine berries is produced. The third year any man on good prairie can harvest his hundred bushels per acre.

The next season, as soon as the frost is out of the ground some two inches, go over the "patch" with a harrow, tearing up one-half the plants; a good dressing of leaf mold and ashes at this time is beneficial.

If much grass or weeds come up, mow off after gathering the crop, leaving it on the ground. We sometimes burn over the "patch" early in spring.

Spring is generally the best time for setting. We have had equally good success when set in August or September, if wet.

Planted seven acres on newly broken prairie sod in May, which bore good crops, with no cultivation. Have occupied the same ground six years successively, with more profit than could be realized by plowing up the berries and putting in any other crop.

Wilson's Albany, promises to be very valuable; Longworth's Prolific, Early Scarlet, McAvoy's Superiors and Jenny's Seedling, are satisfactory, but not as hardy as Necked Pine.

Every family on the prairies ought to have strawberries as plenty as potatoes, for they can grow them as cheaply. Our city markets should be so abundantly supplied with them that the poor could afford to live on them, in their season, instead of affording only a meager supply, to be indulged in as a luxury by the rich.

THE CURCULIO.

Mr. Edwards also says:

At a meeting of the Northwestern Fruit-Growers' Association, several years since, Mr. O. W. Brewster, of Freeport, Illinois, gave a statement of his success in repelling the attacks of the curculio on his plums. Early in spring he scattered lime, which had been mixed for whitewashing under his plum-trees once a week, until curculio quitted the field. He also scattered soap-suds and chamber-lye under them in liberal quantity. I have twice tried the same remedy, with complete success. I once applied it to a small tree, which matured its whole crop; several other trees near it, which set full of fruit, did not ripen a specimen. If plum-trees succeeded with us well, I should have no fears of the curculio.

Wm. R. Prince.—The "Necked Pine" spoken of is a distinct species, not treated by any botanist. It is very acid. The Iowa is another distinct species. This is an interesting fact, as originating upon the western prairies. The Prairie Rose is also a distinct species, found upon the western prairies. It is a singular fact, also, that many new species of plants are found in California.

Mr. Prince said he had been seventeen months in California and Central America, and found countless millions of flowers, and not a single one of them has any perfume. Nor is there a single bird of song there.

Mr. Prince remarked that we repudiate American flowers, far more beautiful than those collected by botanists in the old world and made famous! I have a Caucasian cherry which measures at the largest one inch and seven-eighths in circumference. He gave his flowers to the ladies of the Club.

Mr. Fuller showed specimens of seeds, and showed how easy it is to obtain them. Take very ripe strawberries, and wash and strain the pulp and dry the seeds.

WILD FLOWERS FOR TAME ONES.

B. F. Odell, of Plum Spring, Iowa, offers to send eastward, in exchange for bulbs, roots, cuttings of flowers and ornamental shrubs, plants of the "Dodecatheon Meadia," a pretty, hardy prairie flowering plant, a specimen of which he forwarded.

Mr. Prince.—This is one of the most showy, unique plants we have, native of this country. I have four kinds growing in my garden. This, and many other American flowers, are superior to many imported varieties.

THE PROOL CHERRY.

Mr. Prince showed specimens of this cherry, which was first introduced into this country from France, in 1819, but has not yet become extensively known.

Andrew L. Fuller.—This is a very strong-growing tree. It needs a deal of pruning. The fruit is excellent. The tree does not grow naturally a handsome form.

THE PROVENCE WHITE CURRANT.

Mr. Pardee called attention to a sample of this currant, presented by Mr. Prince, which several members spoke highly of. Mr. Pardee said that, if he had but one fruit, he would select a currant.

THE ROSE SLUG.

Solon Robinson read a communication from Dr. Cyrus Powers, of Moravia, Cayuga county, N. Y., giving information upon the ravages of the green rose slug in Central New York. We copy his letter, entitled

A Plea for the Roses.

Let me premise that with us in Central New York this wholesale and sweeping destruction of this most beautiful class of flowers is getting to be a rather serious matter. Our roses are fast becoming extinct. Many extensive amateur cultivators have almost entirely given up the attempt to raise them, and are throwing away their worthless bushes or letting them die as they stand. The owners of nurseries say that the demand for this lucrative branch of their business has well-nigh ceased; and no wonder that this is so, when the truth is that, with all our care in selecting and growing choice varieties—to say nothing of the expense of purchasing them—for the last three or four years, we have only succeeded in growing an enormous crop of worms.

It is now some six or seven years since they first appeared in this vicinity. At first they were but few and scattering—the advanced scouts, and videttes of the myriad army behind, and caused no apprehension; but each successive year the swarm was quadrupled, perhaps centupled. It is a small green slug, half an inch or so in length, which preys almost unceasingly, day and night, on both sides of the leaves, destroying their parenchyma, leaving its delicate though useless skeleton, which soon drops off. Sometimes in a couple of days every leaf is destroyed on a large, fine bush. And it is the more provoking that the worms always appear just as the flower-buds are opening. You shall go out in the morning, in the early part of June; hundreds of buds are just bursting into life and glory,—your bushes never looked better; and, notwithstanding all your former bitter lessons of experience, you try to indulge the hope that this year the destroyer will not appear. Vain hope! Before night, thousands of minute but active green slugs have commenced their ravages; the next day the shrub wears a sadly blighted look, and in a day or two more every leaf and bud is gone. In a few weeks the poor stricken thing throws out a feeble crop of leaves, but throughout the rest of the season it appears wan and sickly; and in the course of three or four summons, if the process is repeated, it gets tired of waging this ineffectual war, and gives up the struggle.

Can the assembled wisdom of your bucolic and august conclave furnish a remedy for all this? If they can, and will give it to the world—that it will be one of the most useful meetings which they ever had, is the sincere opinion of at least one sufferer.

Four years ago I had upwards of a hundred different kinds of roses, the choicest varieties which I could procure, of which seventy or eighty would be in bloom at the same time. Most of them are dead—having succombed to this regular, deadly, successive annual defoliation. And the sickly survivors—fighting for dear life—have no vitality to blossom. Only two manage to make any show at all—the "Yellow Harrison," which is of so early a habit that it blooms just before the pests appear, and the "Mount Joy," which fortunately blossoms so late that they have nearly all disappeared.

Of course, in this as in other measures, nearly every one knows of a certain remedy. But it does not require a long life, or very extensive opportunities of observation, to find out that "certain remedies" are the most uncertain things in the world. I will mention a few, which I have tried, and their results:

Covering the ground with lime. One of your lady correspondents, a few weeks since, stated that she had saved her roses by keeping the ground under the bushes covered with lime, which seemed to prevent the larvæ of last year's insects coming out of the earth to renew their depredations. I can only say that she is more fortunate than I have been, and I have tried it repeatedly. Like the curculio, this insect, in its imago state, probably flies from tree to tree or bush to bush.

Dusting the bushes with air-slacked lime. I have derived no benefit whatever from this. Thousands of the rascals are lying comfortably *perdu* on the sides of the leaves, feeding undisturbed, while you are raising all this dust overhead.

Picking them off singly, and destroying them. I think one whole family if they were smart, and as numerous as John Rodgers's, might, by working steadily, day and night, without stopping to eat or sleep, make out to keep one bush free from these destructive creatures.

Washing with whale oil soap suds. If the suds is too weak, it does not injure the worm; if too strong, it kills the leaf and blossom. If just strong enough to finish the slug, it certainly injures the leaf and blossom buds, though not fatally, as for a while they stop growing, and have a glossy varnished appearance, resembling the leaf of the orange or English holly. The injurious effects are probably due to closing up or obstructing the minute pores in the leaf by which it breathes. And then the labor of applying this remedy is pretty formidable, as it must be done every few days for some weeks to effectually kill the worm. Sprinkling or syringing does no good; every leaf and twig must be fairly immersed in the liquid. It requires two persons, one carrying a large tin pan, nearly full of the suds, and the other (with hands protected with stout leather gloves) to bend down and immerse in succession each portion of the bush. With tall climbers, it is impracticable; with hybrid perpetuals, or garden roses, which should never be suffered to grow very high, it of course can be done, but the result of my experience is not very encouraging. I have tried it faithfully three seasons, getting scarcely any blossoms meanwhile, and most of the bushes are dead, and the rest look as if they ought to be in a hospital.

Now, can I do anything more to save my roses? We used to think, keep them alive, and in time this scourge will pass away. Possibly this is so, but it seems like hoping against hope. At present the cultivation of roses in this region is far too much like the silk-worm business.

REMEDY FOR THE ROSE SLUG.

Mr. Richardson read a remedy from *The Country Gentleman.* Wash the bushes with a decoction of leaves of Ailanthus.

Mr. Prince.—The rose mentioned as not affected, the Mount Joy, is a prairie rose—the most of the roses affected by the slugs are foreigners. There is no certain remedy for this plague that I know of; mine are not affected. There seems to be a remedy in the entire destruction of roses, slugs and all, in some sections of the country.

Subjects for next meeting: Fruits, Flowers, Vegetables and Fences.

The next Monday being the 4th of July, the Club adjourned over to the following Monday, July 11th, 1859.

H. MEIGS, *Secretary.*

July 12, 1859.

Present, 60 members. Dr. Knight in the chair.

By H. Meigs—Reaping Machine 2,000 years ago.

Gaul used something like McCormick's Reaper before the invasion by Julius Cœsar, about 1,900 years ago. A sort of cart body, sides sloping outwards on two wheels propelled by an ox; the teeth in front cut off the grain heads and fill the cart, while the straw is trodden into the ground as it ought to be to maintain the fertility of it. The cart body was raised or lowered at the pleasure of the driver, to suit the height of the grain. Lasteyrie, in his collection of machines, gives a drawing of it.

The Romans reaped their wheat about *two days before it was ripe.* A reaper (man) cut an acre of wheat in a day and a half—clover in one day. Columella said a good mower cut an acre of meadow grass, and bound 1,200 bundles of hay—about two tons. They cut a second crop. They drained three feet wide and four deep on wet land, laid stones at bottom—some open, some covered—twisted straw and pine leaves and branches on bottom and then earth thrown in. They planted trees for fences, briars and thorns. Eggs were sometimes about $1 each; pea hens about $7 each; doves per pair, about $7.

They sometimes had wheat stool 400 stalks to one grain. They sowed five pecks of wheat per acre; the crop 21 and 32 bushels per acre. In Varr's time, wheat was worth about 40 cents a bushel, and in Columella's time, seventy years after, about $2 a bushel. Land worth 25 years' purchase; interest of money 6 per cent.

Agriculture fell off, and until almost one thousand years had passed the people wore no shirts, could neither read or write; and it is only within the lifetime of this generation that agriculture has begun to revive.

In France, the revival is marked in about the year 1550, by an agricultural book called "Les Moyens de devenir riche," *the way to become rich*, written by an ingenious potter, of the name of Bernard de Pallisy.

Piedmont feeds cattle with extraordinary care, combed, brushed, twice a day *oiled.* Clover and grass in summer, hay, elm leaves, and walnut cake in winter. They are very smooth, round and fat. Lodi gives Parmerson cheese from a mixed breed of red Hungarian or Swiss cow and cattle of Lombardy. These cows are fed five hours a day, and all the rest stalled and have hay. The cheese is made of skimmed milk. Lombardy has its peculiar poplar growing on the borders of division ditches.

TOMATO

Near Pompeii, is grown largely as a field crop—supplies Rome and other places.

CONDOR.

This enormous bird, so famed in the vicinity of Chimborazo and other loftiest of the Andes, dwells also on our California mountains, where he has occasionally been found to measure eleven feet from tip to tip of his wings.

By H. Meigs.—Bulletin Mensual De La Societe Imperiale, Zoologique D'Acclimatation. Paris, May, 1859.

Mons. Pepin distributed seeds of the False Varnish tree of Japan, the (*Ailanthus glandulosa*) to be used for silk worms as they thrive on its leaves.

Mons. Bourgois called attention to Broom Corn as a forage plant, and the seeds also, the *Holcus sorghum* vel. *Sorgum vulgare.*

Mons. Ravel proposes to try his mode of raising truffles in the Bois de Boulonge.

Prof. E. Cornalia, of Milan, (one of our members) addressed a note to the Society relative to the disease of silk worms, with the experience of Mons. Vittadini on the subject, showing the existence of corpuscles of uniform size in the tissues and liquids of the diseased worm, and Mons. Lebert's discovery of these corpuscles in the vitellus (the yolk) of its egg.

We have a bird from Paraguay whose flesh is like that of the turkey, and nearly as large. It is there called the Mitu. (It is a Hocco.)

THE SHEEP OF SPAIN.

By President Renwick:

The idea that the race of fine wooled sheep of Spain had been derived from England, is not new. It is nearly half a century since I first heard it, and it was supported by the quotation of the license granted by Edward IV. in 1465, as cited by Sir J. Boileau. The variety said to have been exported under the license was that of Cotswold. That such a claim should have been made when the merino sheep was hardly known in England is not extraordinary, but that it should have been after the peculiar characteristics of that race had become well known, is astonishing. The mere external characters of the merino differ so much from those of any one and from those of all the British ewes, that the most inexperienced parties could hardly fail to select the merino from any flock with which it might have been mingled. There is among these characters one which seems decisive against the British origin of the merino sheep, as well as against its being derived from any of the extra-tropical climates to which the epithet of temperate is applied. Such climates are marked by great extremes of temperature, and the animals anlunotized in them are provided with a covering which thickens at the approach of winter, and falls off in summer. This covering in the case of the sheep of the British isles is the wool, which is shorn when at its highest perfection. But, if the shearing be neglected the wool loses its oilality and drops off, although probably at a later period of the summer than it would have done, had not the race been subjected for the ages to the shears.

This is not the case with the merino, as I learnt by accident. On a visit about the year 1812 to Vermont, I was shown, by Charles Storer Esq., over his beautiful *ferme ornée* at Bellows Falls. It was the month of September, and I there saw a fine merino sheep covered with a long coat of wool of the usual fineness. Mr. Storer informed me that knowing that the merino sheep did not shed its wool, he was making an experiment for the purpose of ascertaining whether the long stapled wool for the purpose of *combing* could not be obtained from that race. What was the result of this experiment I cannot say, but the circumstances led me to inquire in relation to the habits of the merino sheep, and I found that it did not in Spain, and had not at that time in America shed its wool.

The peculiarity in the merino race leads us to seek its origin in a cold climate of nearly uniform temperature, such as can be found only in elevated regions in tropical climates. The opinion that the merino race was introduced into Spain by the Arabs, if not by earlier settlers of Mauritainave origin, from the lofty valleys of the Atlas, appears far more probable than that which traces its descent from the Cotswold flocks.

AGRICULTURAL SCIENCE.

[By Prof. S. W. Johnson, of Yale College. July, 1859.]

The Institute has received, since the last meeting of the Club, a valuable succinct essay on a very interesting agronomical question, viz: "*The Absorptive Properties of Soil.*" It is a valuable manurial essay—deals in plain terms as well as in those of high science. "Our Indians knew long ago that soil sweetened the flesh even of a skunk—they buried it and it became good to eat. Dogs and foxes bury bones and meat to sweeten them. Old treatises on agronomy allude to the power of soils to absorb gases. Charcoal pulverized covering a dead rat an inch deep, kept it free of unpleasant odor, in the Yale Analytical Laboratory, all summer." "Economy of the ammonia naturally accumulated in the soil. Enormous quantities exist in soils in a state of such intimate combination that boiling the soil with fixed alkalies will not expel it."

"*Water as the medium by which the ingredients of the soil enter the plant.*—From experiment, Prof. Way, of England, questions the influence of water in effecting the distribution of plant food. And Liebig, in his recent paper on the subject (Uebereinige Eigenschaften der Ackerkrume,) has concluded that this force is so powerful in soil that ammonia, potash, and phosphoric acid, when applied as manures, are instantly made insoluble, so that we must relinquish the idea hitherto entertained that plants appropriate their food directly from an aqueous solution. Eichorn's investigation of this point are interesting."

We ask our learned farmers to read Prof. Johnson.

[Journal de la Société Impériale et Centrale d'Horticulture.—Paris, May 1859.]
Translated by H. Meigs.

ROSE.

Mons. Pépin moved a vote of thanks to Mons. Pigeaux for his new rose, growing single at the end of a branch.

Doubts were thrown upon the propriety of pinching flower and fruit buds off vigorous fruit trees.

A new beautiful radish from China is introduced by l'Abbé Voisin. The color a lively red, having horizontal white lines around it. It grows entirely under ground (the root). It is a cylinder rounded at both ends, with long slim single root. There is a variety of it of deep violet color.

RHEUM NOBIL.

Noble Rhubarb, by Hooker, from Himalaya. It is a plant of extremely singular growth. It grows wild on Sikkim, 12,000 or 15,000 feet high; the stalk about 40 inches high. The natives call it chuka—they eat it. It has an agreeable acid taste. The growing plant forms a sort of cone.

Mr. Bruce offered the following:

DECAY IN FRUIT TREES.

I have often heard the practice recommended of driving nails into decaying fruit trees to restore their vigor, but I have never seen the result set forth so strikingly as in a letter to the Southern Planter. A singular fact and one worthy of being recorded, was mentioned by Alexander Duke, of Abbeville, South Carolina. He stated, whilst at a neighbor's his attention was called to a peach orchard, every tree in which had been totally destroyed by the ravages of the worm, with the exception of three, and those were the most thrifty and flourishing peach trees he ever saw. The only cause of their superiority known to his host was an experiment made in consequence of observing that those parts of worm-eaten timber into which nails were driven were generally sound.

When his trees were about a year old, he had selected three of them, and driven a ten-penny nail through the body, as near the ground as possible.

Whilst the balance of his orchard had gradually failed, and finally yielded entirely to the ravages of the worms, these three, selected at random, treated precisely in the same manner, with the exception of nailing, had always been vigorous and healthy, furnishing him with the greatest profusion of the most luscious fruit.

It is supposed that the salt of iron afforded by the nail is offensive to the worm, whilst it is harmless, or perhaps even beneficial to the tree.

A chemical writer upon this subject says that the oxydation or rusting of the iron by the sap evolves ammonia, which, as the sap rises will of course impregnate every part of the foliage, and prove too severe a dose for the delicate palate of intruding insects.

This writer recommends driving half a dozen nails into the trunk. Several experiments of this kind have resulted successfully.

Hon. Charles F. Loosey, Consul General of Austria, presented leaves from his country seat at Staten Island, struck by lightning, each leaf being perfectly blasted from the apex nearly half way down each leaf, confined at the sides exactly by the upper nerves of the leaves.

The Secretary said it was believed that the leaf points are so many delicate arrangements for the distribution of electricity.

E. Merriam, of Brooklyn, presented some new grass seeds.

Extract from letter of Dr. A. McCall, dated Rome, Tenn., June 2, 1859:

"I enclose some few grass seed that grows on loamy, sandy, shaded, alluvian soils. It springs up tender rich bunches in February, and the seed on stems four feet high, are ripe in June. Stock are so fond of it they destroy it, except it be protected in August and September. For fifty years I have observed this indigenous grass, and now I gather a gallon of seed to test it by culture. I suppose five to fifteen bushels of seed might be had from an acre. If you shake a bundle of it the seed drops off. It grows among paupau, grape vines, the cardina pink root, May apples, sugar maples, and white walnut trees."

Dr. Wm. S. Carpenter, of Westchester, presented specimens of rye from Italy. One not hardy—the other as white as wheat—long grain, seed heads beardless, on a long beautiful foot stalk, holding nearly 100 grains each.

Fine White Smith gooseberries; fine Brown Bob gooseberries; Grosse Blanche transparent currants.

RHUBARB WINE.

Solon Robinson.—Jacob Woodruff and A. D. Wright, of Ripon, Wisconsin, think I have done them injustice in giving the honor to Mr. Cahoon, of originating the manufacture of rhubarb wine. They say that he obtained his information from them. They add:

"We have been experimenting with the pie plant for six or seven years past, and in 1856 and 1857, made over 1,000 gallons of wine from it. We have had it on sale in New York city about a year."

I answer, who knew it? Probably Messrs. Woodruff & Wright, and some obscure person employed by them to sell the wine. It is possible that they have not yet learned the power and value of advertising. If the value of rhubarb wine, and where it was for sale in New York, were known, a thousand gallons would not remain unsold in any respectable commission merchant's hands a thousand minutes. A wine that can be made as cheap as cider, and as good as first rate sherry, will sell faster than Woodruff & Wright and Cahoon & Lewis, ever thought of making it, notwithstanding the assertion that the plant will yield 2,500 gallons per acre.

REMEDY FOR BUGS ON PLANTS.

Sulphur 3 lbs., 3 lbs. of tobacco stems, 3 lbs. of hard soap, 30 quarts of water; mix and boil, and add as much more water, and syringe the plants.

CALIFORNIA STRAWBERRIES,

it is stated, have been raised that weigh ten to the pound.

GRAFTING.

Pare off a spot on the stock, and graft, leaving the end of the graft projecting downward, and after binding them together place the butt of the graft in a jar of water.

WORMS ON TREES.

Solon Robinson read a letter from H. M. Dewey, of this city, inquiring how he shall prevent his maple trees from being destroyed by worms.

Wm. Lawton.—Cultivate birds.

Thos. W. Field.—He must give up the Maple and plant Ailanthus.

Wm. P. Prince.—Or Paulownia.

Andrew S. Fuller.—Or Catalpa.

Mr. Prince.—I wish to put on record my opinion that the Catalpa is a native of Japan. I have an abundance of evidence, which is conclusive to me, to corroborate this fact, notwithstanding it has been so long considered a native of this country.

Wm. S. Carpenter presented two samples of extra fine gooseberries—the Crownbob, which is one of the hardiest sorts grown, and the Whitesmith, also an excellent berry, and both grown without mildew, by severe pruning and high cultivation.

Andrew S. Fuller presented Houghton's seedling gooseberry, which never has mildewed with him, here or in Wisconsin.

CURRANTS.

William R. Prince exhibited several varieties of currants, including the original red Dutch, and the advance that has been made by the seedlings produced—the White Provence, the Versailles, the Champagne, the Cherry. The Corinth currant of commerce is a dried, seedless grape. Another currant introduced by Mr. Prince, he calls the Corral; it is a very handsome red berry. The red Provence currant has red shoots like red dogwood when the shoots are young

A NEW SEEDLING RASPBERRY

was shown by Mr. Prince, which promises well. It is a seedling of the Red Antwerp.

A NEW VARIETY OF RYE.

Wm. S. Carpenter presented a sample of new hardy rye, remarkably prolific, and very white and heavy, yielding 30 bushels per acre. It is an Italian variety, which he highly recommends to the attention of farmers. The seed was obtained from the Patent Office.

CARNATION.

Andrew S. Fuller presented 152 specimens of seedling carnations, of great beauty.

A SEEDLING RASPBERRY

was also shown by him, which is very fine, and several other of known varieties, very superior. The Fontenay raspberry is an everbearing variety, that bears its heaviest crop in the fall of the year.

THE YUCCAFILAMENTOSA.

Mr. Fuller exhibited stems three feet long, covered with these beautiful flowers, from seedling plants only two years old.

THE CURCULIO.

Doct. Trimble attempted to prove that the same insect that makes the black-knot, destroys the plums and other fruit.

Upon this question a considerable discussion ensued between Mr. Prince, Mr. Field, Mr. Cumming and others. The latter said that his remedy for the curculio was syringing the trees with a solution of tobacco water and sulphur, &c. The solution is afterward washed off by rain.

Mr. Prince thought that every new plant introduced brings with it a particular worm or insect. The curculio never attacks the limbs of native American cherries.

And Mr. President, why trouble ourselves about the little plums so loved by the curculio? Our noble plums the *Magnum Bonum and Egg plum* are attacked by the bugs! *In a forest of common plums loaded with curculios, the Magnum Bonum and Egg plum remain untouched!*

Thos. W. Field.—Every plant seems to have its peculiar enemy. Plant a few tabocco plants, and you will have the long green worm where there was none before. So of a thonsand others.

Mr. Cummings.—My cherries are covered with black-knots, while my plum trees, within thirty feet, are free from the insect. The following is the mixture that I have used: Whale oil soap, 1 lb.; sulphur, ¼ lb.; water, 12 gallons. Then take half a peck of lime, and dissolve in 4 gallons of water, settle and pour off, and add to the other mixtures. Then add 4 gallons of strong tobacco water, and apply with a syringe.

REMEDY FOR ROSE SLUGS.

Solon Robinson.—I wish to call the attention of the Club to the fact that we are not confined to this room in our discussions. See how quick we get responses to questions agitated here from distant parts of the country. Here are two to the rose question talked of at the last meeting. The first is from V. H. Van Vleek, of Hamilton, Madison county, N. Y., who says:

"With me the lobella inflata has proved an effectual remedy for the green slug. I have usually sprinkled or sifted the powdered leaves and pods on the bushes while the dew was on, or while they were wet. One application is generally sufficient. An infusion, sprinkled on when the bushes are dry, may be equally good. I think this remedy equally good for other enemies of bushes and vines, and it will not injure them."

This, as Mr. Van Vleek suggests, I have no doubt will prove good for other plants, to keep off some, if not all of the pests, and like aloes, infused in water, or the French remedy for bugs, one of the camomile family. It is worth trying.

The fruits and flowers were given to the ladies.

Next subject,—"Fruits, Flowers, Curculios and other Destructive Insects."

Here is another letter, from a lady who has before favored us with her valuable experience. It is from Ruth Lynde, of New Bedford, Mass. She says:

The discussion of the Club, on 25th of June, incites me to confirm the results of six years' experience with regard to the treatment of rose bushes. I have healthy bushes, fine flowers, and, while the plants of my friends looked as if they had been scorched by fire, mine have full foliage, and few marks of that destructive scourge, the slug.

When I commenced gardening, I found three pests, thoroughly domiciled, which I have tried for six years to destroy—first, the green canker-worm, which attacks the flower bud only; second, the slug, which feeds upon the leaf; and, third, the rose-leaf hopper, which sucks the juices from the ribs of the leaf. The slug may be detected from the spots of rust, and the hopper from the white, mealy appearance of the leaf.

As soon as the leaf-buds put forth, and the flower-bud is formed, a brownish fly, with a hump on its shoulders, may be seen hovering around the bushes; a few days after, the tops of the folded leaves may be noticed fastened down with a web, and, upon removing this and straightening the leaf, there may be discovered a green worm, with a black head, which, upon being dislodged, moves about with great activity, and, falling, spins a web, like a canker-worm. If left undisturbed, it eats into the bud, fastens itself into a leaf, and remains in a chrysalis state until the second growth of the buds, when it appears ready to repeat the same process: I know of no remedy for these but to examine the bushes and dislodge the intruders. I have some mornings found eight or ten on one bush. If the mountain ash buds appear first, the fly seems to prefer these to the rose.

The slug is only found on the leaves, and I have rarely seen it on any plant but the rosebush. The progenitor is a jet black, glossy fly, which winters in the ground, and is not found any great distance from the plant the slug feeds on. This slug is an ill-looking worm, almost transparent, which seems to cling with leech-like tenacity to the leaf, which it reduces to a skeleton. When first hatched from the egg it is very small, scarcely visible to the naked eye. It is very voracious, and strong and active, and moves in the night.

Many remedies are proposed to destroy these pests, and the one most in favor is oil soap, a pound to fifteen gallons of water. Some put tobacco stems in this mixture, and syringe the bushes. If, in the commencement, the fly can be destroyed by these applications, there is nothing to fear, but if the egg has been deposited near the leaf stalk, all these seem unavailing.

The height of their ravages is from the middle to the last of June, and if air-slaked lime be thrown under the bushes, when they are about to fall to the ground, it will destroy them. I have proved it, for upon over thirty rose bushes, I have not seen twenty slugs, and we once had legions of them. Again, I burn every leaf that shows the trace of the insect. I kill all the flies in the spring that I can take unawares, and twice every season I put lime under the bushes, and I have nearly exterminated them. But I work every season, and if these be destroyed another insect will appear; for I have observed last year and this a new insect, fish-shaped, clinging around the bud, and so firmly attached that it is almost impossible to remove it. The rose leaf hopper is whitish, and agile as a flea, and like the plant-lice seems ever on the increase.

The best remedy for these is to fill a wide mouthed bottle with Scotch snuff, tie a bit of muslin over the top and sprinkle the snuff on the plant, and syringe it off next morning.

To preserve rose bushes where the slug had been feeding, I should cut off every leaf; burn these and put lime on the ground—air-slaked lime—and in August, I should put on lime the second time, and at the end of a week dig it in; and in the spring, when the leaf was well formed, put lime on again. Every slug killed is a gain to the bushes. I have not a Brahmin's tenderness for insect life, and I burn all that I find. Canary birds are fond of those slugs. The wholesale destruction of birds brings its compensation in an increase of insect annoyances. A treaty of peace and protection with the birds would be the surest way to escape from the ravages of this multitudinous host. A gardener informed me that a friend of his kept his bushes free from slugs by dashing water on them after sunset, and thus killed the parent flies. I have a climbing rose (Mistress Hovey) in full foliage, and a Russell's Cottage, all its leaves fresh and green, which I have managed as stated.

I write in haste, fearing, if I wait, it will be too late to benefit the rose bushes.

Another letter upon the same subject, is from M. B. Arnold, of Eatonville, Herkimer county, N. Y. It says:

My rose bushes were so infested with the slugs four or five years ago, that there was scarcely a leaf on them but that looked as though it had been scalded, and that effectually. I took an old tin pan partly filled with ashes, with a few hot embers and small coals spread over it, and on this I spread tobacco leaves (dried and pulverized) liberally, and set it under a bush, changing it from place to place under the same, shaking the branches after I thought they had enough. I treated each bush in the same way a second time, perhaps within a week of the first, which sufficed for that season. In a short time they put out new leaves, and flourished well the rest of the season. The next summer they paid me another visit, and received the same treatment as before, with like result. I have so much confidence in the remedy, that I would like to have all the tobacco raised this season and next appropiated for the benefit of the slugs, instead of destroying the health and polluting the breath and lips of fathers, husbands and brothers, all over the land.

Solon Robinson.—Here is another remedy. It is from The Gardener's Monthly. It says:

We have made some experiments in order to ascertain how high the temperature of water may be, without injury to very young shoots of roses that may be covered with green fly, or aphis, when applied as a remedy. We find the insect readily killed at 120 degrees. One plant of Paul Perras, which was plunged three times, for a second each time, into water at 135 degrees, has a very few black spots on the tenderest of the leaves. The insects were instantly killed. Water at this temperature is, therefore, perfectly safe for anything. As a remedy against all soft-skinned insects, we regard this as the most simple and effectual discovery ever made.

July 18, 1859.

Present, 38 members. Dr. Trimble, of Jersey, in the chair.

Mr. Meigs :—

Our great tree Washingtonia, of California—baptized by Europe Sequoia Gigantea—succeeds in Europe as far as Northern Europe. In England it bore fruit in 1858, at Thetford, under care of I. Buckle. Some alarm prevailed as to its health—the small limbs fall off. (The trunk is out of all proportion as to its size compared with its branches.) It was not injured, however. Lobb began it in 1853, and sold single plants for $5.25 out of Veitch's nursery.

American Weeds and Useful Plants, being a second edition of Agricultural Botany, Illustrated by Dr. Darlington; Revised by Prof. Thurber; 460 pages, 18mo, is full of valuable information.

[By Henry Meigs.]

NEW WORKS RECEIVED BY THE AMERICAN INSTITUTE SINCE THE LAST MEETING.

Presented by the Hon. Charles F. Loosey, Consul General of Austria—The Verhandlungen Mittheilungen, des Neider Osterreischischer Gewerbe Vereines. [Transactions of the Trade Union Society of Lower Austria,] containing the recent improvements in chemistry, chemical technology, mechanics and mechanical technology, with statistics, &c.

From Kentucky.—The Valley Farmer, of July, 1859, which contains a compliment well merited to the Agricultural Society of Massachusetts, for their *one thousand dollar premium for a plantation of forest trees grown from seed, on not less than five acres.* One white oak for every twenty square feet ship-timber to be grown. Competition for the premium in 1870. Notice of beginning on or before January, 1860.

From Wisconsin.—The *Wisconsin Farmer, Madison, July* 5, says: That a Georgia farmer plants this year one hundred acres of the Chinese Sorghum. It grows better than any he plants. He fed all his stock on it since the first of August last—better for hogs than anything he ever gave them. It has changed my farm from a *provision buyer* to *provision seller.* I think I shall sell this year from $1,500 to $2,000 worth, and have plenty left for family and stock. Last two years I have made 1,200 to 1,300 *gallons of syrup,* all more or less granulated sugar. It grows finely on land run down by cotton and corn, and I think it will prove valuable as a rotation fertilizer. Mark that idea! Not half the cost of culture as corn or oats. I fed my seed to stock.

PARTHENOGENESIS.

Mr. Meigs :—

This absurd theory has recently been subjected to more close observation and of course dissipates. The follies of the Acarian products of chemical action form food for laughter among true chemists. Such is the weak propensity to stretch a small fact into a system of the universe. The monoculi in science are many, and their nasals are Himalayas—so with the pitiable one idea man. God alone knows how life is in matter. All created beings know not the life in a mustard seed or in a gnat.

Crosse, of Scotland, became very credulous on the subject of the acarus —Greek for *mite*. It is capable of living for a time in boiling water, or in alcohol. Our common itch insect is one of these acarians, or sarcoptes.

Regel lately comments on the subject botanically. He makes *parthenogenesis*, which means *born of a virgin*, another technical phrase, *cælebogyne*—meaning literally a *batchelor woman*. He denies the whole notion. He finds male flowers where none were supposed to exist in Spinacia, or *spinach*, one of a family of 63 genera and 360 species. And the *mercurialis* one of the *euphorbiaceæ*, or spurge worts, of which we have 191 genera, and 2,500 species. A large portion of this order is poisonous. India rubber is from one of them.

WILD CARROT.

The well distinguished Vilmorin, of Paris, tries to add to our stock of useful plants, such as are in their wild condition even worse than useless. He has taken the wild carrot, and in cultivating it in his manner for three generations, has made it a good wholesome vegetable. He has also *created*, we may say, a race of beets producing twice as much sugar as their ancestors. This process was selecting the most sugary beet in a crop and planting by themselves for a few generations, and the new race is permanent if planted out of the reach of other sorts.

Carrot is biennial, native of Europe and America. Here it remains abundant as a weed. I show a specimen.

DECAY IN FRUIT TREES.

Driving nails into fruit trees to make them healthy and free of worms, is an old story. It now comes up anew from California, where the treatment is said to have proved of great advantage.

The Chairman.—This is an absurdity. No change takes place to affect the insects on the tree.

Mr. Lawton.—I tried this foolish plan of driving nails into trees, and killed them. At least, those died, while those not tampered with lived, and so did the worms, as long as the trees were alive.

PROPAGATION BY BUDDING.

Mr. A. S. Fuller.—Propagation by budding has many advantages over that by grafting.

1st. It can be done in the summer, when, as a general thing, we have more leisure than in the spring. Most grafting must be done in the spring, or not at all; root grafting, however, is mostly done in winter.

2d. Many kinds of trees that it is very difficult to propagate by grafting, such as the peach, cherry, apricot, pear on the quince, etc., are easily propagated by budding.

3d. Budding is an economical mode. In grafting we must use two or more buds, while by budding we get the same results by using only one. This is of great importance when we wish to multiply new and rare varieties.

4th. If the bud fails to grow, the stock upon which we have operated is not destroyed, but only scarred where the bud was inserted, and we can sometimes repeat the operation the same season; if not, we have only to wait until another year.

5th. Budding can be performed with more rapidity and certainty than grafting.

What time in the summer shall we bud? is a question often asked, and a very difficult one to answer.

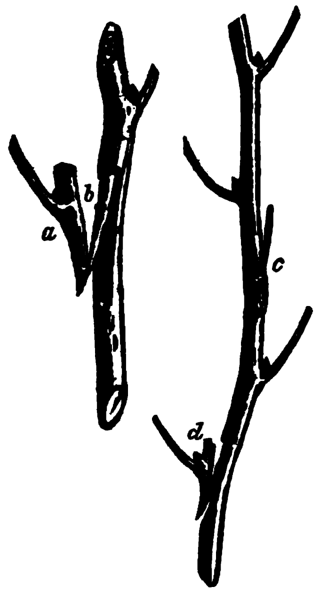
There are many rules laid down by our best authors, but there are so many exceptions to all of them that none can be implicitly relied upon. None of them will apply in different locations or different soils in the same location. Some tell you to bud your cherries in July, without knowing what kind of soil you have, or variety of stock you intend budding in.

We have cherry stocks that must be budded this week (July 20) or not at all this season, yet within one hundred feet of them are others that cannot be budded successfully until September or October.

If your soil is deep and rich, and your stocks grow late, you must defer budding until late in the season, or the buds will be likely to be smothered by the bark growing over them. Or, if not smothered, they will sometimes push out, make a feeble growth, and be killed or very materially injured in the winter.

The Mahaleb Cherry, the stock of which is used for dwarfing the larger growing varieties, will on good soil grow very late, and we have budded them in October, with scarcely a failure.

Quince stocks with us grow until frost, while the seedling pear stocks are so much affected with the leaf blight that we are compelled to bud them so early as we can get buds sufficiently ripe to use.



We can hasten the ripening of the buds by pinching off the ends of the branches a week or so before we cut them. We should endeavor to have the buds fully developed. When the terminal is formed, plump and firm, the branch will do to take off, but it is better not to use the upper two or three buds, or the lower ones, as they are not generally so good as those in the center of the branch.

PREPARING THE BUD.

The practice of removing the wood from the buds has been discarded as useless by most of our nurserymen; but it may be a question whether some varieties of trees would not succeed better if the wood were removed.

If the dwarf pear, which we import in

such quantities from France, does succeed so much better than those grown in this country (as some claim for it), may not their superiority be in some degree attributed to the mode of propagation practiced there.

The French nurserymen say that it is the universal practice to remove the wood from all buds of the pear that are put on quince, and it is believed by them to be the only way to make them long-lived and healthy trees.

It may not be best to remove the wood in budding all kinds of trees, although it undoubtedly is with some. If the wood is taken out, branches must be used from which the bark will readily peel from the wood, without leaving the inside surface rough.

Hold the branch from which you take the bud in your left hand; with the smaller end toward you, insert the knife-blade a half an inch below the bud, cut rather deeper than you would if the wood were to be left in, pass the knife above the bud some three-quarters of an inch; then cut across through the bark only, about half an inch above the bud (*c*); then with your finger and thumb lift up the bark; at the same time press it gently forward, and you will take off the bark and bud (*a*) without injuring it in the least, leaving the piece of wood (*b*) adhering to the branch.

This plan is much better than to pick it out with the point of a knife, or slip it out with a goose quill, or several other plans laid down in our books, and considered by some as orthodox.

MODE OF OPERATION.

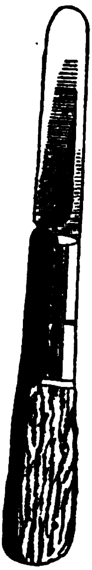
The budding-knife most in use is one with an ivory handle, made flat and thin for raising the bark. They can be found in any store where horticultural implements are sold. But we consider them the greatest piece of old-fogyism ever palmed off upon an intelligent set of people, as those engaged in horticulture are supposed to be.

The very idea of using a knife from five to eight inches long, and being obliged to reverse it every time you set a bud, is too much for Yankee go-a-headitiveness to put up with. Some of the best nurserymen discarded this clumsy ivory wedge long ago, and others would if they could once see a better knife in operation.

This knife, here represented, is simply a small pocket-knife, with a thin blade, round at the end. The cutting portion extends about one-third around the end of the blade, and about two-thirds of its length, leaving the lower part dull.

In using it, take it in the right hand, letting the fore-finger clasp the lower part of the blade. . Make a horizontal incision in the stock first, and from this an incision down the stock about an inch long; lift up the edge of the bark by passing the back of the blade to the horizontal incision without removing it. Lift the bark on the other side in the same way. If your blade is smooth, it will raise the bark without disturbing the alburnum or half-formed wood.

If the bark parts freely from the wood, it is not necessary to raise it the whole length of the incision with the knife; only enough to allow the point of the bark on which the bud is to enter the incision, and let it raise it as it passes down to its place.



Budding-knife.

We do not know of any place where these knives can be purchased, and those that use them are obliged to buy small pocket-knives with handles that suit, and get blades put in.

We hope some of our manufacturers of cutlery will soon relieve us of this trouble by making a knife of this style; but we can set 2,000 buds a day easier with this knife than we can 1,200 with the other.

Wm. S. Carpenter.—I have discovered that by half girdling a branch of a dwarf pear tree, a lateral can be produced, and so you can shape your tree to your liking.

R. G. Pardee.—A friend of mine had a magnolia stripped of limbs, and his gardener produced new limbs by puncturing the bark and winding a wire to stop circulation slightly, until the new buds start. The process was very interesting.

Mr. Tulla.—If you would like to get something new and handsome, you can bud the flowring almond, of different colors, into a plum stock, which may be first cut and grown into any curious shape. The result is a very beautiful shrub.

Mr. Pardee.—I have lately seen some very interesting specimens of dwarf peaches in pots, full of fruit, not over three feet high. Also dwarf nectarines. Both of these fruits may be grown in any conservatory. Mr. Sargeant, of Fishkill Landing, has one of the most splendid collections of dwarf fruits and valuable trees in this country. Leaf mold and pure land, heat and moisture only are needed to produce these beautiful trees.

SEEDLINGS.

Mr. Fuller.—In producing new varieties from seeds, or hybridizing, all the difficulty is to get the first variation from nature. After that there is no difficulty in producing an almost endless variety. Look at apples, for instance, all derived from the wild crab.

Mr. Wm. Lawton.—I have mulberries that came from a stock of mulberry trees imported from France by Thos. Paine, and although I do not particularly admire the fruit, it is worth raising for the poultry, if for no other use. Fowls are very fond of the berries.

Mr. Solon Robinson.—I consider the mulberry superior to any other berry for puddings, on account of its mucilaginous quality; and the Downing Seedling is superior to all others in size and flavor.

GOOSEBERRIES.

Mr. Wm. Lawton.—I find no difficulty in raising gooseberries free from mildew, by using none but cold manures and mulching. Soft hay is the best substance for mulching.

Mr. Pardee.—I have the Sheba Queen gooseberries that grow free from mildew, and did on sandy soil.

Mr. Fuller.—You may grow gooseberries upon a clay soil, or under the shade of trees, but I cannot in open ground upon sandy land.

THE ROSE.

A lady writes upon the subject discussed at former meetings, that she has found the following plan a remedy for the slug: Take tar and powdered sulphur and fumigate the bushes, repeating the operation two or three times. It is done by setting stakes so as to hold a sheet around the bush, with the fumigator inside.

WORMS DESTROYING THE AILANTHUS.

Wm. S. Carpenter stated that he had lately seen several ailanthus trees entirely stripped of foliage by worms.

The Secretary stated that he had seen a nest of worms in the trunk of an ailanthus that was cut down. There is no tree, it appears, then, that is free from worms.

A GRAPE VINEYARD—THE DELAWARE GRAPE.

Mr. R. G. Pardee.—I visited Dr. Grant's vineyard at Iona last week, on an island in the Hudson, where he has reclaimed a rocky hard soil, and made it wonderfully productive by manure and muck. He has now a great number of Delaware plants coming on for next season, beside great numbers of other choice varieties. He is doing a great benefit to the country in producing some of the best wines I have ever seen, as well as the best varieties.

DOWNING'S SEEDLING MULBERRY.

This fruit was in full bearing, and the fruit is the largest and handsomest that I ever saw.

THE FAMILIES OF CHERRIES, PLUM TREES AND CURRANTS.

[By Wm. R. Prince, of Flushing.]

No. 1.—*Cerasus hortensis*—Person.
Cerasus macrophylla—Poiret.
Merisier and Guignier, of the French.

This family of cherries comprises two divisions, both of which are sweet; the Heart cherries with soft flesh, and the Bigarreau cherries, with firm crackling flesh. The original species is a native of the south of Europe, and the varieties (of which there are more than fifty of great excellence), are consequently less hardy than the two following families. The trees attain a lofty stature. There is a splendid double-flowering variety grown only for ornament.

No. 2.—*Cerasus caproniana.*

Cerisier, of the French.

Duke of Kentish, of the English.

This family, natives of the north of Europe and very hardy, comprises also two divisions, one of which is composed of very acid varieties, and the other of semi-acid varieties; the latter division containing such as have been hybridized between this and the previous species. The trees of the Kentish varieties are of low stature with a rounded head. Those of the Duke varieties, are of a pyramidal form, and in stature between the Kentish and the preceding family.

No. 3.—*Prunus Avium.*

Griottier, of the French.

Morello, of the English.

This family, natives of the north of Europe, and very hardy, comprises trees of low stature, with a rounded head. The fruit is invariably black, with a bitterish acidity, remarkably palateable to many persons. Various liquors are manufactured from this class, and especially the celebrated *Kirchenwasser*. It is also greatly preferred for cherry brandy. The fruit matures later than the varieties comprised in the preceding families. There is a splendid double-flowering variety whose blossoms are proliferous.

The conclusions to be arrived at from a consideration of the above facts, are these:

The varieties of Family No. 1, are suitable to the warmer states of our Union, and flourish as far north as Hartford, and in some localities farther north.

The varieties of Families Nos. 2 and 3, may be successfully cultivated still further north, and the Kentish and Morello varieties as far north as Montreal.

PLUM TREES.

I deem it of importance to communicate through you to the public a list of such varieties of plum trees, grown on this Island, as are here free from the depredations (unless in some solitary instance,) of that pernicious insect which makes its attacks *by perforating and stinging the wood*, thus poisoning the sap and producing as a result the excrescences which are so numerous on the Damson and some other varieties.

Brevoort's Purple,	Italian Damask,
Blue Imperatrice,	Jefferson,
Bradshaw,	Magnum Bonum, yellow,
Cherry or Myrabolan, red,	do do white,
do do golden,	Nectarine,
Chicasaw, red,	Orange,
do yellow,	Orange Egg,
Coe's Golden Drop,	Prince's Yellow Gage,

Duane's Purple,
Elfrey,
English Yellow Gage,
Huling's Superb,
Imperial Violet,
Imperial Ottoman,
Italian Prune,
Prunus Americana, all the varieties,
Prunus Pubescens,
Prunus Maritima,
Red St. Martin,
Tomlinson's Charlotte,
Washington.

The following varieties are the least affected *by attacks of the curculio on the fruit*, yet they frequently suffer a partial loss:

Guthrie's Apricot Plum,
Italian Prune,
Imperial Gage,
Small Drap d'Or.

THE FAMILY OF CURRANTS.

The edible currants, cultivated in Europe and America, comprise four species, and more than fifty varieties. The species are

European.—Ribes Rubrum, Ribes Nigrum.

American.—Ribes Floridum, Ribes Missouriensis or Aureum.

About thirty-five years ago Thomas A. Knight, President of the Horticultural Society of London, grew several seedling varieties of the Ribes rubrum, which were announced in the catalogue of that society as

Knight's Early Red,
Knight's Sweet Red,
Knight's Large Red.

These are the only *new varieties*, and with ten other varieties of Ribes rubrum, and six varieties of Ribes nigrum and one of Ribes petræum, now no longer cultivated, comprise the entire number enumerated in the third edition of their catalogue, published in 1842, more than twenty years after the establishment of that society, aided by an immense capital to advance its objects.

The three varieties presented little if any advancement, they being all very similar to the old Red Dutch, and this lack of progress arose from the fatuity that Mr. Knight and the society had remained quite ignorant of the existence in France of very superior varieties, which he should have availed himself of when commencing his operations. Even up to the present period, being twenty-seven years additional, but one new variety has been produced in England, the Victoria, and this was an accidental seedling.

In France the results have been very different. The French people surpass all other European nations in the seminal production of new and estimable varieties of fruits, and are only equalled in the production of new and rare flowers by the Chinese and Japanese.

They have originated the following estimable currants:

Red Gondoin,
White Gondoin,
Cerise or Cherry,
Hative de Bertin,
Fertile de Paluan,
Blanche Perlée or Pearly Currant,
Blanche Transparente, or White Transparent,
White Provence,
Red Provence.

And more recently

Versaillaise,	Gloire des Sablons,
La Cancaee,	Belle de Fontenay,
Imperial, rouge,	Cerise á longue grappes,
Imperial, jaune,	Fertile Precoce d'Angers.

In our own country we have originated

Lovett's Seedling,	Prince's Albiness, large transparent white,
Prince's Coral, large red,	

and several other fine seedlings, not yet named nor disseminated.

The varieties of the Ribes nigrum, or European Black currant, have a peculiar *musky* odor, unpleasant to most persons, but which is lost when made into jelly or conserves. The Ribes floridum, or American Black currant, possesses also an unpleasant perfume. The Ribes Missouriensis, of which there are six or seven varieties in our gardens, produces showy yellow flowers, some being fragrant and black, blue, red, yellow, or golden fruit of no unpleasant odor, but there are none of these berries as palatable as are those of the Ribes rubrum.

I will now present a catalogue of the varieties cultivated in gardens.

Attractor, white.
American, black.
Bang-up, black.
Belle de Fontenay.
Black English.
Black Naples or Grape.
Champagne, flesh-colored.
Cherry or Cerise, red.
Cherry, long bunched, or Cerise á longues grappes, red.
Fertile d'Angers, red.
Fertile Precoce de Paluau, red.
Gloire des Sablons, striped berries.
Golden or Orange.
Gondoin, red.
Gondoin, white.
Green or Brown fruited.
Hative de Bertin, red.
Imperial Rouge.
Imperial Jaune.
Knight's Early Red.
Knight's Sweet Red.
Knight's Large Red.
La Caucase.
Large Red Boulogne.
Large White Boulogne.
Lovett's Seedling.
Magnum Bonum, red.
Maple-leaved Red.
Maple-leaved Black.
Missouri Black.
Missouri Blue, sweet.
Missouri Violet, large.
Missouri Red.
Missouri Yellow.
Missouri Golden.
Pearly Transparent.
Prince Albert, red.
Prince's Albiness.
Prince's Coral.
Red Dutch.
Red Grape.
Red Provence.
Short-bunched Red Dutch.
Variegated-leaved Red.
Variegated-leaved White.
Versaillaise.
Victoria, red.
White Dutch.
White Grape.
White Pearl.
White Provence.
White Transparent.

GUANO FROM THE PACIFIC.

Mr. Meigs:

Members will recollect that this Club, a short time ago, recommended to the United States Government to claim the guano islands discovered by our citizens, and which were out of the jurisdiction of other nations. It was done. We now see that the Jarvis and Baker islands are shipping home heavy cargoes of the American Pacific guano. July 3d, 1859, Jarvis Island, the clipper ship Phantom, of Boston, ... 1,000 tons.

do	do	Victory, of New York,	....	1,000 tons.
do	do	Argo, do	....	1,600 tons.
do	do	Gosport, do	....	per cargo.
do	do	Polynesian, do	......	1,100 tons.
do	do	Josephine, do	....	per cargo.
do	do	Modern Times, do	....	do

Probably 7,000 *tons*, and new islands of guano discovered.

The 7,000 tons are worth *over a quarter of a million of dollars* to the Guano Co.; and to the farms of the United States in increased production (as 200 lbs. fertilizes a proper acre—70,000 acres) of at least 20 per cent crop, say four bushels of wheat per acre—280,000 bushels, worth more in profit to us than the whole cost. In much land this guano gives fifty per cent crop, or eight bushels profit, or over 500,000 *bushels*.

[Revue Horticole, Paris, June, 1859.]

GRAFTING BY APPROACH

Is recommended in the following way. The side of the graft is pared off so as to fit as nearly as possible a spot pared off a stock near the ground; the graft and the stock are secured as usual, the butt end of the graft *being set in a jar of water*.

Subject for next meeting.

By Solon Robinson.—"The best manner of preparing ground and seed for winter grain."

The Club then adjourned to Monday, August 1st, 1859.

H. MEIGS, *Secretary*.

August 1, 1859.

Present, 36 members. Mr. Thomas W. Field, in the chair.

The Secretary, after making some remarks on the steam plow, read extracts, translations, &c., made by him from the foreign and home publications, received by the Institute since the last meeting, viz:

THE STEAM PLOW

Is about producing a revolution on our farms quite analogous to that on the seas. Europe has anxiously sought for it—declares that it is about coming. We have said that if human ingenuity can do it, Americans will first appear with it.

A few days ago the American, Fawkes, exhibited his plow, and seems to have triumphed, with his 40 acres a day. As with the mowing machines, so with this, time saved is great additional wealth. When the frost leaves the farm the farmer always longs to have it plowed, if it could possibly be, in one day, that he may plant. And the machine, after plowing, is a movable mill. It can pump a large stream of water up to the house and barn, saw wood, plane planks, churn butter, turn all mills and grindstones, go to market with 20 wagons of produce, haul back manure, go on the farm and scatter it, then plow it in, drive the washing machine, drop hay, cornstalks, straw, turnips, and everything else; heat all the water, drive swinging fans to dry cloths or cool your rooms, go to the forest and cut down trees and pull up the stumps, saw up the logs, hoist them on to cars and haul them home, &c., &c., and if the owner cannot employ it all the time he can hire out his mechanic mammoth, to his neighbors, so that it need never be idle.

Boydell's Traction engine is now employed on the highways carrying coal to Manchester for two pence per ton per mile.

SICKLY PLUM TREES.

The Pennsylvania Farmer now says that salt freely applied to the surface of the ground around the tree, and over an area as wide as the extent of its branches, and strong brine to wash the trunk and limbs, and pulverize salt in a hole bored into the tree to its centre, and plugged up, are all of them certain means of restoring the tree to health, and trees sickly or enfeebled, troubled with curculio, bug or black wart, are brought up to a healthy condition. That the plum is naturally a marine tree, and it is surprising how much salt it will assimilate and thrive on.

[Prairie Farmer, Chicago, Illinois, July 21, 1859.]

The U. S. Agricultural Society offer their grand gold medal of honor for that machine which shall supersede the plow, as now used, and accomplish the most thorough disintegration of the soil, with the greatest economy of labor, power, and time and money. (The American Institute now offers a thousand dollars.)

CLEAN ALL YOUR SEEDS.

The Wisconsin Farmer, July, '59, Madison, says:

"Professor Buckman, of England, has recently made some careful investigations as to the amount of *seeds of weeds* contained in seeds sold as clean. He found in one pint of clover seed 7,600 weed seeds; of cow grass 12,600; of brood clover 39,444. Of two pints of Dutch clover, one of the pints had 25,560 weed seeds, the other 70,400 weed seeds. The fecundity of some weeds is truly astonishing. The Professor counted 8,000 seeds in one black mustard plant, 4,000 in a charlock, 46,000 in a stinking camomile, 26,000 in one common burdock.

[California (San Francisco,) Culturist, July, 1859.]

FORAGE OF THE PACIFIC.

No one can deny that, however humbling it may be to our State pride in regard to agricultural resources, the question as to how her future herds of cattle and horses are to be supported, is becoming of grave import, owing to the frequent want of forage during the dry, parched and cheerless condition of summer and autumn. Few countries have better natural pasture grasses than our indigenous soils. We must introduce and test foreign grasses.

GRAPES

Love a volcanic soil.

CORK OAK.

Plants from seed sent by the Patent Office, are doing well, indicating a future successful growth. Mr. Dresel watered some of them, the seeds, from time to time—not one grew. He left 85 unwatered, and 81 grew and are doing finely. That the Cork, (*Quercus suber*) will flourish here, is beyond doubt.

We think the Chufa for fattening cattle, swine and poultry, is worth five times as much as potatoes. You leave it in the ground until wanted. By analysis it is greatly superior to potato and Indian corn. About one-sixth part of Chufa is vegetable fat or oil. Fig tree, 7½ feet in circumference, four feet above ground.

The chairman and several gentlemen wished it distinctly understood that the Chufa is not a plant that infests land if neglected in any country where the land freezes.

OLIVE.

At the Mission San Fernando, 500 old olive trees make 800 gallons of oil in a season.

Monte grows corn from 14 to 22 feet high with from two to four ears per stalk, 100 bushels an acre.

[Bulletin Mensuel De La Societe Imperiale, Zoologique D'Acclimatation, Paris, May, 1859. Translated by H. Meigs.]

AQUÆCULTUM.

The acclimation and breeding of fishes, should form part of a science which is yet in its infancy. Mons. O'Ryan d'Accena, gives us the happy idea that it is *cultivating the waters*. The study of this science will embrace all observations on the oceans, currents and inhabitants, not only a few fishes, but all sorts, shell fish included, and their acclimation. The most precious, as oysters, &c., to be acclimated in thousands of places where they are not now. The crabs of England, as large as dinner plates, on the proper grounds of America, &c.

CULTURE OF THE LEECH.

This valuable creature is now cultivated. Mademoiselle de Ruffieux, of the Department of the Aire, has myriads of them, of different ages, in her reservoirs. She commenced in 1849. The Leech requires the water where it deposits its eggs, to be shallow. She feeds them with blood from butchers, but finds it better to let horses into the water and thousands of leeches fill themselves. About twelve acres are devoted to the leech culture. Her profits by the sale of leeches, has surpassed all expectations, although the expenses are large. Never was success better merited than this by Mademoiselle Ruffieux.

Auguste Dumeril, Secretary of the Society, states, that they have received from Australia the noble *Cereopsis*, a species of goose—flesh very delicate—wander much, is very warlike, can be tamed; believes that the

Eider Duck can be acclimated. The Bronze Wings Pigeons of Australia, are received.

Mons. Chauvin has published a work on the making of oyster beds.

Mons. David announced the arrival from South America, of seeds of the South American Forage, the Yerva de Grimea.

APPLES AND PEARS.

Wm. S. Carpenter, of Harrison, Westchester county, presented several specimens of apples and pears of the summer varieties. Carpenter's Seedling, proved on tasting, one of the most delicious of our summer apples. The fruit-growers who were present, considered it well worthy of propagation. It is of a melting nature in the mouth, and mildly acid and buttery. The Red Astracan is also an excellent apple.

DOWNING'S EVER-BEARING MULBERRY.

Dr. Grant exhibited some fruit of this variety, which the Chairman said is the only sort that is really valuable. The Doctor said one of its good qualities was its abundance of tartaric acid. It commences fruiting in strawberry time, and continues through the summer.

Mr. Carpenter presented some specimens of rye, showing the new white rye that he is growing to great advantage.

THE APPLE SQUASH.

Mr. Carpenter showed two of these in condition for eating, and said they possess quite a fruity flavor. They are flat, about an inch thick, and three inches across, and grow in bunches on the vines, being very prolific.

Mr. T. W. Field presented specimens of the Doyenné d'Eté or Summer Virgalieu, of handsome color and fine flavor, growing on trees which have not been in this country four months, having been planted on the 3d of May last. Fruit medium size, obovate, rich, aromatic flavor, melting and very juicy; tree fine shape, very rapid growth, and very productive.

SPONTANIETY OF LIFE.

Mr. Solon Robinson read a lengthy letter from John M. Kennedy, of Philadelphia, which, after speaking of the deep interest with which he always reads the reports of the Farmers' Club, offers for its consideration his theory upon the prevention, of late, of insects destructive to fruits, grain and food-producing plants. His theory is that it is owing to "spontaniety of life." He says:

"Science has, as I think, dogmatically assumed that all organic life must of necessity originate from a produced germ, seed, or egg, and from this stand-point is seeking to comprehend why our fruit trees, cereals, &c., are so subject to destructive insects, worms, &c., and to find a preventive thereof. It will be conceded that, if premises are unsound, the more logical the deductions, the more certain are the conclusions to be erroneous. Hence, if the assumption that all such worms as the curculio, and insects in our grains, necessarily originate from produced and deposited eggs, is in fact an error, then all experiments to find a preventive through the use of external applications must be more or less irregular, speculative, and uncertain. It may seem irrational to the savans of this day to assert that the phenomena of spontoneous life is constantly occurring among us. So they have before disputed many things now accepted as truth. For instance, in medicine, the theory of Hahnemann. I respectfully submit that the true explanation and the effective remedy for these obnoxious insects and worms can only be found in recognizing 'spontaniety of life;' and if our savans are called upon to explain, satisfactorily to our reason, why pine forests are succeeded by oaks, why lime-quarry ponds so soon are peopled with fishes, new mud-banks covered with wild grapes, and highly cultivated grass lawns exhibit spots of inferior grass, why weeds so suddenly appear in fields from which a luxurious harvest has just been reaped, and similar phenomena, or abandon their dogma—for dogma it is—'that only from acorns can oaks originate,' then we can be free to point out the error in our science of agriculture and horticulture, which inflicts the penalties referred to. To illustrate how blindly we defer to the authority of science, let me ask who among its honored representatives pretends to explain the law through which the apple and pear, grafted on limbs of a quince tree, organize the special wood character of their genera, and produce their peculiar kindred fruit, in contradistinction to the quince wood, and fruit of the natural engrafted limb of the same stock. This phenomena will cease to be a phenomena when we cease to look at it from the false stand-point that all organic life must originate from eggs or seeds.

"All experience shows that in the economy of generation and reproduction, through the co-operation of the male and female principals, the product is limited by the law that like begets like. This is true of both the vegetable and animal kingdoms. We see a 'progression' in the condition or refinement of a genera or a species of organic life may be attained through the use of favorable external means, but the product is ever restricted to the same genera or species. This proves there must be in the economy of nature, a provision by which, without such union and co-operation of male and female entities, a higher form may be born from a female parentage belonging to a lower form. I say proves so, or the development theory is a humbug. For it implies, in fact teaches, the mineral is the parentage of the vegetable, the vegetable of the animal, and the animal of the human kingdoms. To have been so, it follows either that the law of like begets like is not immutable, or there is a law of progression through which nature acts outside of like begets like. If there ever was such a law, the inference is it exists also to-day, and is sufficient to affirm the same phenomena among us.

"Every theory should prove itself when tested by occurring facts. Test this by the varied phenomena referred to, and it will explain them, though it conflicts with popular science and theology. But truth is a unit, and all truth is God's truth, and all of us are, in reality, weak, ignorent children. Let me, therefore, ask you to give this a fair consideration. You and I desire to learn the truths of nature, for they are God's truths. The prevalence of insects and worms in our grain and fruit trees is a serious evil. It will increase if not more intelligently addressed.

"I hope you will appreciate my motives, and acquit me of trespassing."

GOOSEBERRIES—MILDEW.

Dr. Jansen, of Brunswick, Ulster county, N. Y., sends the following remedy for preventing mildew on gooseberries, as practiced by Mr. Baker of that place, who contends that mildew is caused by an excessive flow of sap; so his remedy is:

"Early in spring to take a large plow and plow deep very near the bushes, so as to disturb and break up some of the lateral roots, thereby diminishing the quantity of sap and preventing mildew. He says he has followed the plan for the last seven years, and in all that time has never been troubled with mildew. Has plenty of large and fair fruit, and his bushes in a healthy and thrifty condition. Try it; the remedy is simple and easy, and the cure effectual and certain."

Mr. Fuller.—The great advantage of this is that it helps to keep the roots cool—that is all the secret in raising gooseberries.

R. G. Pardee.—I saw, a few days since, in the garden of Charles Downing, at Newburgh, some 20 varieties of gooseberries, all perfectly healthy. He finds no difficulty in cultivating the most tender sorts.

FLOWERS.

In a miscellaneous talk about flowers, it was conceded that the hollyhock of improved sorts is the handsomest flower now in bloom.

R. G. Pardee.—The finest hollyhock I ever saw came from a seed I gave a young man two years ago, it is crimson, and made up of a great number of little flowers in one. I recommend every one to save seeds of these flowers wherever they are to be had from handsome flowers, and plant them at once this fall, and they will flower next year.

Mr. Meigs imported seeds of the highly improved hollyhock, from London, in 1825, and dahlia seed also. Planted them alternate about three feet apart. There flowers intermixed thus with the dahlias presented a splended floral assemblage, so attractive to butterflies that they came in great numbers to join what seemed a national butterfly convention. I took a broken raisin between my lips, and taking care to hold my breath, approached large butterflies, some of whom got off the dahlias on to my nose and sucked the raisin. They became familiar and several perched on my hat and shoulder while I was hoeing.

Andrew S. Fuller.—The bulbs of lilies are made up of scales, in layers. If these are pulled apart, and set in pots in a gentle heat, each will grow and produce as good a plant as the whole bulb. Some of the hardiest bulbs served in this way will grow out of doors. I have divided a bulb, such as some gardeners charge three dollars for, and made twenty dollars worth of plants from it, as good as though I had made them each from one of these costly bulbs. The bulb of the grandular does not reproduce flowers, if left in the ground. Take it up, and you will find a great number of little bulbs, or seeds, attached, each of which will produce a plant and flowers.

DEAD WOOD INJURIOUS TO PEAR TREES.

Mr. T. W. Field read an article of Lewis Berkman, that rotten wood is not good as a manure for pear trees. Pear trees need great care and skill when young.

PHLOX FOR BED PLANTS.

Mr. R. G. Pardee.—I have lately seen a good many very fine gardens, where no expense is spared for handsome plants, and I think a bed made of a variety of phloxes, which cost but a trifle, the finest I have ever seen. I recommend ladies to save seeds, and sow beds in the spring.

RASPBERRIES.

Mr. Fuller.—A mean, contemptible, red raspberry will out-sell, in this market, the very best of a different color. It is a fact that the Brinkley Orange, one of the finest flavored berries grown, won't sell in the New York market.

PEARS.

Dr. C. W. Grant spoke highly of the valuable qualities of the Flemish Beauty pear, and how readily it will now sell, yet it is only a few years since it would not sell as well as the Bartlett. The public taste has to be educated, as they have about this pear, and then they will appreciate better fruits of all kinds.

STRAWBERRY SEED.

Mr. Fuller stated that a friend of his has this year saved twenty pounds of clean strawberry seeds, which he intends to distribute all over the country gratuitously. Now, as each pound probably contains half a million of seeds, there will be a chance for some new varieties of strawberries.

PREPARING WHEAT GROUND.

John G. Bergen, of Long Island.—Upon my soil I have satisfied myself that deep plowing is not advantageous. I do not speak against subsoil plowing upon some soils, but upon such as I cultivate. I have tested it to be of no advantage.

Mr. Carpenter.—I think shallow plowing might answer for rye, but not for wheat. I have tried both deep and shallow plowing, and in all cases have found a very beneficial effect from deep plowing. On any soil that I have ever tried, deep culture has proved highly advantageous.

Mr. Bergen.—I am not an advocate of shallow plowing, but find that upon a sandy soil it does not answer to turn up the soil deeply, particularly for wheat, and I have found no advantage in subsoiling sixteen inches deep. We manure very highly, and find that plowing ten inches is the right depth, at which the land has been plowed for many years. If I was going to put in a crop now in August, when the land is dry, I would like to have it plowed pretty deep. Our land below where the plow usually runs becomes very compact and hard, and I don't see what benefit the subsoil plowing of this year will be next year, when it has already packed down again so hard.

Mr. Pardee thought that if he had put on manure in proportion to the increased depth, he would find the whole improved, and equal to the top soil.

Mr. Field.—I don't go against deep tillage, but I have a piece of filled-in ground, nine feet deep, but it does not produce any better than soil that is shallow.

Mr. Fuller.—If your soil is deep—no matter how deep—if the water do not run down, the moisture will come up. I have a piece of ground that was almost as hard as a brick, which I dug up two or three feet deep, and manured richly, and it has been loose and moist ever since.

The "best manner of preparing land and seed for winter grain," to be continued.

Adjourned to Monday, August 15th, at noon.

H. MEIGS, *Secretary.*

August 15th, 1859.

Present, 43 members. Mr. William Lawton in the chair.

The Secretary read his translations and extracts from foreign and home works on agriculture received by the American Institute since the last meeting, viz:

[Bulletin Mensuel de la Societe Imperiale Zoologique d'Acclimatation, Paris, June, 1859.]

SALMON IN PONDS.

M. Jules Cloquet, a member of the Institute, speaks of domesticating the salmon in ponds of fresh water. At St. Cucufa, near St. Cloud, in one of the Emperor's domains, by M. Coste, under the eyes of his Majesty, a small pond (in a shady village,) about 2½ acres of surface, and in parts 19 feet deep, well grassed at bottom, the water cool and limpid, comes from neighboring hills by filtration, forming a cascade at its outlet. Put in order three years ago. Trout first put in are 20 inches long.

In 1857 thousands of young salmon were put in among the trouts, and notwithstanding their enmity, the little salmon have prospered so that last month, by his Majesty's order, a net drew up more than 500 lbs. weight of them. They are twenty-two months old, and are from five to eight inches long, and weigh, on an average, 120 grammes. All these fishes are reproducing.

This raising salmon in close fresh water ponds is new to science. Nothing appears to prevent the success of this magnificent experiment to raise salmon. It appears now that salmon and trout lay their first eggs at the age of eighteen months.

Our Washingtonia, Sequoia giganta grows well in France, in England, and in Van Houtte's garden at Ghent. Loves moist climate and soil, and he latter siliceous and swampy; it plunges its roots into adjacent stagnant water. Succeeds by budding; plants grow unusually; must be set out several times.

Journal de la Societe Imperial et Centrale, d'Horticulture, Paris, June, 1859.

The *chemical composition* of the soil is of the highest importance to vegetable life, for when a plant does not receive from it, in a state of solution, the necessary nutritive matter, it cannot properly develope itself. Imperfect nutrition is the essential cause of the laying of the cereals. It has been generally attributed to meteorological causes. The grain stalk is, in general, very rich in silica. Deep culture brings the soil to air, and that gives us silica in solution. The difficulty begins in the soil—want of organic strength—then comes a legion of injurious insects, then atmospheric difficulties. causing the phanerogame parasitic enemy, Oidum Fungus, rust, Cryptogami, spores, the gui, Cusanti, the *little Orobancks ramosa*, (Philipæramosa Coss and Germ) which attaches itself to hemp and to tobacco at their roots. The Cryptogame (no sex or seed), are more numerous and infinitely more troublesome to us than others. They disease more plants than all the rest together.

The microscope extends our views and promises to reward us one day by great and useful discoveries.

REAPING MACHINES.

The Emperor Napoleon superintended the trial on his farm, Fouilleuse, near St. Cloud. Foreign and French machines were tried. First premium, a gold medal and one thousand francs. Forty-five machines offered, twenty-two tried. Eleven foreign and eleven French. Burgess & Key foreign two-horse reaped fifteen acres of wheat in ten hours. Second premium to Cranston's of America, improved by Broad of London.

The McCormick reaper was the one exhibited by Burgess & Key, who own the English patent.

LONDON

Is to have a new and splendid garden at the West End, at Kensington Grove, on part of the ground purchased for the exhibition of 1851, out of the surplus profits of it. It is to be in charge of the Horticultural Society of London. It is a parallelogram of about fifty acres. Of which twenty will be the garden. The *Queen gives five thousand dollars*, and *Prince Albert twenty-five hundred dollars* to aid it.

Steele's Bee protector against moths is tried and highly approved in California.

Agricultural Hall at Sacramento—120 feet by 100; for exhibitions; two stories; July 15th, 1859.

Our California gardeners prune melon and tomato, cucumber and squash vines, cutting off *unproductive vines*.

Apricots *six and a half* inches in circumference, near San Francisco.

CRAB APPLE OF NORTH AMERICA.

Here is a specimen. Three in a bunch, very like large cherries; very beautiful flesh as well as color; very pure in constitution; as sound as crystal.

Lindley, in his Vegetable Kingdom, says: They grow plentifully in Europe, in northern Asia, the mountains of India, and North America; rare in Mexico, unknown in Asia, except on the northern shore, and in Madeira, unknown in Africa, entirely absent from the Southern Hemisphere; one solitary species is found in the Sandwich Islands.

Downing says that the London Horticultural Society contains 900 varieties of apples, and nearly 1500 varieties have been tested there, and that new kinds are perpetually coming from seeds in our country.

This crab grows best in our middle states, especially the western parts of Pennsylvania and Virginia.

No serious efforts have been made here to experiment on improvement by budding, grafting, &c.

The Michigan Farmer, July 30th, 1859, says that a gardener, for economy, and to gain warmth for his trellis plants, applied coal tar with lamp black, one-eighth the cost of oil, and found that all the insects which had always before injured his fruit staid away, and he had fine crops. Supposes the coal tar disgusts them.

LONG ISLAND AGAIN.

Mr. Meigs called attention to the following, as being a just view of that admirable island.

The Soil of Long Island.—It has long been a subject of wonder to us, why so many people go out West while in the vicinity of New York, so ample a return for well bestowed labors may be anticipated, no further off than a few hours journey on this Island. There are probably nearly half a million acres of untilled but cultivatable land on Long Island yet. In 1847, the American Institute appointed a committee to visit Long Island, and examine the barrens thoroughly. Considerable interest was felt in the matter, and, with the committee, 170 in all, highly respectable citizens, many of them aged gentlemen, examined the lands, and resolved, "That these lands, so long left in a state of nature, are of immense value for tillage for the vine, mulberry, orchard, garden and field productions, and fitted to reward the appropriate investment of money and labor in their good cultivation, to the full extent that can reasonably be desired." In passing through this section you will occasionally come upon a few acres, like the oasis in the desert, in striking contrast with the surrounding forest. Here some one has ventured, and by hard labor has cleared away the oaks and brought the soil into subjection, receiving as the reward therefor abundant crops; for on the land so cleared can be found as fine fields of grass and grain, as fine orchards and crops of berries, as can be found anywhere. There can be little doubt that any energetic young man, with sufficient capital to buy a dozen acres, and work it a year, can lay the foundation for a competency by investing in these Shrub Oak Barrens.

THORN SEEDS.

Solon Robinson.—A friend wants to know how to raise plants from seeds of common thorn, for a hedge, which he has tried to do and failed.

Mr. Fuller.—The seed lays in the ground two years in a natural state. If scalded and planted in boxes or hot houses, they can be forced to come forward sooner.

WHITE EGG PLANTS.

Wm. L. Carpenter showed some of the fruit of the Chinese white egg plant. He said it is more prolific and much better than the purple. It bears in clusters, the fruit being as white as ivory on the surface, and some six or eight inches long and two inches in diameter, and very smooth and beautiful.

STRAWBERRY SEED.

A letter from Berlin, Green Lake county, Wisconsin, wants the club to tell him when and how to plant strawberry seed. He has done just what I wish every one would do. He says: "I have saved the seeds of some fine large and sweet ones, and mean to try to get some seedlings."

Mr. Fuller.—Sow them now or next spring, in a fine garden soil, in a half shady situation, and they will continue to vegetate for more than a year. Sift the soil a quarter inch deep while light, and water often.

Mr. Pardee.—I would advise amateurs to be careful not to cover the seed too deep. The same advice will apply to many other small seeds. Don't cover them too deep.

TO MAKE BLACKBERRY OR CURRANT WINE.

Add three pounds of refined sugar to each half gallon of the pure juice and one quart of water, and let it ferment and work off freely at the bung-hole. Care must be taken to keep the cask full. I would not recommend adding over fifty per cent of water to the juice of any fruit to make wine. The great fault is over-watering. Some grapes will make wine without sugar, but there are but few that will answer. Use more juice and less water, and give your wine age. Don't sweeten your must until you make syrup, when your intention is to make wine. I have lately tasted wine made of blackberries that was equal almost to the very best imported grape wine. It was well worked in a barrel, by keeping it constantly filled up, so that all the froth, and matter rising with it, would go over until fermentation ceased, and then bunged tight, and stood till a convenient time in winter and spring to draw off and bottle, and then corked tight, sealed and laid down till two years old, when it becomes a truly excellent wine.

A CLOTHES DRYING MACHINE.

Solon Robinson :—

Mr. Daniels of this city introduced to the notice of the Club, a model of a clothes drying machine, that certainly seems worthy of the attention of all city residents, who have not much room in back yards; and we think it will prove equally valuable in the country, in saving shoveling paths to the clothes line. A post with four cross arms, each eight feet long, is so constructed that after hanging the clothes upon a hundred feet of line, extending from arm to arm, the whole can be hoisted to the top of a post fifteen feet above the ground, by a windlass and pulley that operates easily. The arms revolve on the post, so it is not necessary to approach it upon only one side.

ASHES FOR MANURE.

Solon Robinson.—Here is a letter from J. D. Lynde, and is dated Faribault, Minn., July 28, 1859.

"I read with much interest the reports of the meetings of the 'Farmers' Club,' and as I am just commencing to farm and desire to make my land the most productive possible with the means at hand, I have thought it best to ask you for some advice, so that from the experience of yourself and associates, I might proceed with safety. I can obtain any amount of stable manure and wood ashes—both have lain out doors and been wet again and again by the rains. I should like to know their relative value as fertilizers (1.)? Also the best time to apply the ashes and the manner of doing it (2.)? And in what quantity (3.)? And will ashes with the manure make the land more productive than manure alone (4.)? The land is a loam or gravelly clay subsoil."

"P. S.—I shall follow the suggestions of the 'Club,' when practicable, and will report my success if desired."

Mr. Fuller.—(1)—The relative value of these manures depends entirely upon the soil. Some western soils are already so rich that manure is of no use. (2). It is not very important when manure is applied (3), nor in what quantity, since that all depends upon circumstances.

Mr. Pardee.—(4)—I would apply the ashes and manure composted together, and it may be put upon almost any crop, or could be here, to great advantage.

Solon Robinson.—I would, if here, apply it entirely as a top-dressing upon grass land. Some western soils are full of potash now and don't need ashes.

SPALDING'S PREPARED GLUE.

Some of this substance was introduced and very highly spoken of by Mr. Pardee and others. Mr. P. said that he had used it upon wood, glass, leather, &c., and found it one of the most convenient articles he had ever used. It is said to be prepared with some substance that holds the glue in solution, just as boiling water does, which evaporates quick and leaves the glue to fasten the two substances together, similar to an ordinary glue joint.

THE CULTIVATION OF WINTER GRAIN.

Adrian Bergen.—Our practice on Long Island formerly was to plow the land very much. Now we prefer to plow but once, and that in September, and sow immediately, adding no manure until Spring, and then top-dress with manure, guano, or other fertilizer. We use potato or oat ground; the soil is clay-loam, and pretty level. In Pennsylvania, I saw farmers turn clover sod, and sow and harrow in wheat, and get a good crop. We count thirty bushels of wheat per acre a first-rate crop.

R. G. Pardee.—That may do on the old fields of Long Island, but generally I do not think it would answer. The soil must be manipulated until it is thoroughly pulverized. At least eight per cent of the soil must be made as fine as flour. Generally, wheat fields are not pulverized half as much as would be profitable. On new lands the surface is covered with that finely pulverized soil, of the woods' mold. After that is exhausted the land fails to produce because the owner fails to pulverize it sufficiently. The reason Mr. Fuller is so successful as a horticulturist, is because he has made his soil pulverient. The forepart of July is the best time to stir the soil, and make it very fine. It cannot be made too fine for any purpose.

Mr. Van Brunt, of Long Island.—We sow wheat upon land that has been in garden vegetables and well worked during the summer, and consequently does not require so much stirring at the time of sowing.

Mr. Fuller.—My rule is to stir land at any time—any month. I would like to hoe my garden every day.

Mr. Quinn, the manager of Prof. Mapes's farm—The best crop of wheat I have ever seen was upon well-drained land, near Newark, N. J., plowed deep and fertilized with superphosphate, and finally pulverized, and drilled in, and cultivated. It produced 50 bushels per acre. Until we adopt some such improvement, as a general thing, we must expect to hear of continual failure of wheat crops.

John G. Bergen.—Whatever it may be in some places, as a general thing, on Long Island, under draining will not pay. It won't do to lay down an imperative rule for under draining. We must keep the exception constantly in view.

Mr. Quinn thought there is no sandy soil that will not pay for draining. He has spent $50 an acre for draining, and had it all return in four years, by the increase of crops, and he thought in a drouth that under drains would be highly beneficial to the sandiest soils in this country.

WHEAT RAISING IN ILLINOIS.

Solon Robinson.—I will read a portion of a letter from Marshall co., Ill., which speaks of the present crop as a good fair average of the last six years, and then says:

"It is manifest that the quantity of wheat grown per acre is diminishing; and unless some means are discovered whereby more certainty in the growing of wheat can be attained, it will be a losing business. Indeed, it is very questionable if the raising of wheat now pays the farmer, on an average, saying nothing about the capital invested in land, more than the lowest wages paid ordinary farm hands. When the season is favorable, a good crop is grown, and the prices are sure to be down. Selling wheat at 40 to 60 cents per bushel scarcely pays the farmer better wages than he pays his hired help; and when he fails to grow a crop at all, he looses seed, expenses, and all; and there are many who have, since last harvest, bought flour for bread and wheat for seed, at a high figure. A more perfect system of raising wheat will have to be adopted, or the risk of failure is so great that the business will have to be abandoned. The rye crop was good. Though not extensively raised, it is coming into favor, as it stands the winter well, and it can be sown in the fall and harvested early, not interfering with other crops."

Mr. Meigs exhibited a crab apple from our forests, resembling cherries in size, very beautiful in color and admirable for pure health. He stated from Lindley's Vegetable Kingdom, Downing, and others, the varieties. That no efforts are reported to have been made, of any importance, in order to increase its size. Lindley says it is found in many places *north* of the equator, but not a solitary one *south of it*, and as Lindley has availed himself of the labor of five hundred botanists, he is not likely to be in error.

Mr. Fuller.—Gardeners cultivate a dozen sorts of them.

Hon. John G. Bergen.—Some call me, although I am only a middle-aged farmer, an Old Fogy, because I do not instantly adopt their new rules—while older farmers say I am *Young America!* Now, what I wish to make plain is, that, according to my own experience, and that for years on no small scale, I have found that there are so many exceptions to old as well as new rules, that I find numerous cases of error in almost every lesson, and that is is because the nature of the soil, the weather, the seed, the tillage, the fertilizers, all show fallibility. I therefore say to brother farmers, *note the exceptions!*

The Secretary exhibited a pear from Long Island so perfectly like an apple that no member doubted. It had not the least of that *fire-blaze form*, the *Pyrus*, which gave it the name of *Flame-shaped apple*, i. e. "*Pyrus malus*."

THE MAPES FARM.

The following gentlemen connected with the Farmer's Club visited Mr. Mapes' farm, near Newark, N. J., on Wednesday, August 3, 1859: Messrs. James Knight, William Hall, William B. Leonard, John Jay, Peter Wyckoff, John P. Veeder, Thomas W. Field, Henry Meigs, D. R. Jaques and L. P. Williams. A special committee, consisting of Messrs. Meigs, Jay, Field and Jaques, were appointed to draft a report. The following is their report:

This farm contains one hundred and twenty acres; a very large portion, however, is in grass, lowland meadow and wood, leaving but 33½ acres devoted to crops, and to this portion the attention of the committee was particularly directed. The superintendent, Mr. P. T. Quin, who was educated as a farmer by Professor Mapes, and who is well posted, not only in agriculture proper, but in all the sciences applicable to this pursuit, showed the committee the mode of manipulating all the crops, and answered, with the greatest readiness, all questions in relation to the produce of the farm. He supposes that the results this year will exceed those of last year probably one thousand dollars in profit.

Our attention was called to less than three quarters of an acre of rhubarb, from which it was stated has been sold this spring five hundred dollars' worth of product. This rhubarb is raised between rows of grape-vines, placed twelve feet apart, two rows being in each of these spaces. The lower part of the vineyard is so appropriated, while in the upper part between each two rows of grape-vines are two rows of either Lawton blackberry or Fastolf and Franconia raspberries. These Lawton blackberries are now in full bearing, and the amount of produce is beyond anything we have ever seen—single stools certainly containing, in some cases, nearly, if not quite, a bushel of fruit. Indeed, on the old wood, the leaves are scarcely visible for fruit. This portion of the vineyard was stated to contain about eight hundred grape vines, and consequently a far greater number of blackberry and raspberry bushes, after being cleaned thoroughly in the spring, are mulched with a coarse, salt hay, thus rendering all cultivation during summer unnecessary, and preventing the growth of weeds. The salt hay will be removed in the fall and used as bedding during the winter.

We next viewed a peculiar kind of fence, made by machinery, on the farm. The pales are round and pointed at the top, while the rails are flat. The pales are first made, and, after shrinking by seasoning, the rails of green wood are bored to receive the pales, and shrink upon them so firmly as to render nailing unnecessary. The manufacture of this fence, beyond the cost of lumber, does not exceed ten cents per rod. It is both durable and light.

The Beet Crop.—The committee was informed that this crop will give twelve hundred bushels per acre. It, in common with all other row crops on the farm, is cultivated with the tools which will be hereafter described.

The parsnip crop is as usual, and in former years was stated to have given twelve hundred bushels per acre.

The onion crop is supposed to be able to yield eight hundred bushels per acre. The rows are perfectly straight, parallel, and free from weeds, and the onion stands so thickly in these rows as to crowd each other. The distance between the rows being about twelve inches.

The summer cabbages were nearly off, but from the portions remaining it was evident that they had grown at less than twenty inches apart, or at the rate of twenty thousand per acre. The refuse portion still standing are five heads, and ninety per cent of them are doubtless marketable.

The late cabbages, of which there are some acres, at the rate of twelve thousand per acre, are in fine order and thoroughly clean.

The potato crop includes several acres, and is entirely free from weeds. The kinds grown are the Prince Albert, the Boyden, the Peach-blow, the Mammoth Nutmeg, and the Buckeye. The yield evidently will be very large.

We were shown a plantation of currants occupying less than the sixth of one acre, from which has been sold, as stated this season, ninety dollars' worth of currants.

The leading feature of this farm, however, is its dwarf pear trees, stated to be about two thousand in number, planted in rows, generally twelve feet apart, and in some cases twenty feet apart, and in the rows eight feet from each other, the spaces between being used for various crops, grown as near the trees as the plow and other tools can be run. These trees contain a larger amount of pears than any other dwarf pear trees we have ever seen, many rows averaging from one to two hundred pears per tree. These are many of the choicest kinds, and the whole crop, as stated, was sold last year at eight dollars per hundred, and the year before at twelve dollars and a half per hundred. Eight hundred of these trees are young, and therefore are suffered to bear only five pears each, the rest having been removed.

The stock of the farm consists of two pair of coach horses, one farm horse, four mules, three short horned cows, one short horned heifer, one pair of oxen, and several pure Suffolk pigs.

The tools of the farm are its greatest curiosity. They consist of a few plows of the best kinds, Mapes & Gibbs' digging machine, Mapes' lifting subsoil plow, Knox's horse hoe, horse weeding machines of various widths, potato diggers, and many special tools for the manipulation of special crops. The farm is all under-drained and subsoil plowed. The digging machine, at a single operation, manipulates the soil to a depth of twelve inches, as thoroughly as if it had been sieved. This machine taking the place for surface preparation, of the plow, the cultivator, the harrow, the roller, and the rake leaving the surface in fine garden tilth. The potato and corn crops on this farm are cultivated flat, without hilling, and altogether by the use of the lifting subsoil plow, the weeder, and the horse hoe. The row crops cultivated as follows: The original preparation of the soil includes, thorough subsoiling as well as deep surface plowing; corn, parsnips, and other seeds for row crops are sown with a machine drill, so that the rows are straight, and equi-distant from each other; as soon as they show themselves above ground a one-horse lifting subsoiler is run half way between the rows; this lifts the soil but one inch at the bottom of the line of travel, and much less at the surface of the soil, suffering it to fall back to its original position, leaving the plants thoroughly cultivated thereby, with a looser soil than any plowing arising from a surface plow, and to a depth of twelve inches, instead of the ordinary hoe depth. As soon as the ground is settled, the one-horse weeder is run between the rows; this shaves two inches of the surface soil and carries it over a comb, which permits the soil to fall back finely divided while the weeds are left on the surface to be wilted by the sun. These two implements, with a single mule and a boy, keep the entire farm thoroughly cultivated during the spring and summer months, and free from weeds; they do the work of forty men with hoes, and with the assistance of these and other tools the whole farm is worked by seven hands.

The bark of all the trees on the place is perfectly clean, and this effect is produced by the use of the tree wash, which has been so often described by Prof. Mapes, made by dissolving one pound of caustic soda in one gallon of water. This is applied to the surface of the trees, destroying all ova of insects, cocoons, dead bark, etc., but not affecting or injuring any live portion of the tree; this particular soda differs from potash, which frequently destroys the tender portion of trees.

The committee cannot forbear referring to the rhubarb wine made on this place. When cherries come in market the pie plant or rhubarb will no longer sell, and is therefore used to manufacture wine. The quality is not unlike the still champagne of the finer sort; it is white in color, with a fine aroma, and a rich flavor. Prof. Mapes states that five times the quantity of wine of this kind may be made from an acre, even after the spring sales of rhubarb are over, than can be realized from an acre of grapes. The currant wine, examined by the committee, was also of an extraordinary quality, being of a light rose color, and retaining all the fine fragrance of the fruit, while it has the character of wine and not of a cordial, as is usually the case with currant wine.

A new implement was exhibited on this occasion, called the iron plowman. This may be attached to the beam of any plow, and it takes the place entirely of the plowman,—he who drives the plow not being required to hold it. Indeed, it so simplifies the operation that any boy can plow as well by the assistance of this instrument as the most experienced plowman.

The manure used on this farm is the nitrogenized superphosphate of lime, invented by Prof. Mapes. The small amount of manure made at the stables, is well cared for and judiciously used, but this is applied to a very small portion. The amount of phosphate we understand to be six hundred pounds per acre for the more valuable crops, while the grass receives one hundred and sixty pounds top-dressing per annum, and thus a continuous yield of three tons of hay per acre is maintained.

H. MEIGS, *Chairman.*

Subjects adopted for next meeting: "The best food for stock in winter." "Subsoil plowing and draining."

The Club adjourned to Monday, August 29th, at noon.

H. MEIGS, *Secretary.*

August 29th, 1859.

Present, 49 members. Rev. Dr. Adamson in the chair.

The Secretary read the following translations and extracts made by him from foreign and home papers, received by the Institute since the last meeting.

[Revue Horticole. Paris, July, 1859.]

FRUIT SYNONYMES.—BY BARRAL.

Much embarrassment is caused by many names for the same fruit.

The Urbanist pear is called Beurré Drapier, Louise d'Orleans, Beurré Gens, Urbanist Seedling and William Prince.

THE FRUIT GARDEN OF THE MUSEUM.

Two new numbers have just appeared, 23 and 24. The descriptions of fruits are very exact, and the drawings admirably colored. Among the pears is the Mouille Bouché, very abundant in our markets in the fall. It is sometimes called the Vert Longue, or Long Green. We have also common the Gros Martinsec.

The name of Washington is imposed on a plum showing its American origin. But whatever may be said of it, it cannot compare with the Queen Claude, which it resembles.

As to Pomological Conventions, we think there are too many. A union convention of all is very much wanted—for no one can make law for the whole. The Horticultural Society of Lyons has begun the goodly work. A programme, signed by all its officers and its able Secretary, General M. Willermor, calls for one in September.

The Abbe Moigno says that a rich amateur horticulturist lived on his own domain in the north of Belgium, all alone, no family at home, concentrating all his affections upon his garden. He died. His son, who lived in great style in Brussels, sold the plants on it to Paris for 20,000 francs! And this brilliant collection, worth 300,000 francs, was transported to Paris. It was *unique* in Europe.

CHEAP PROTECTION OF PLANTS.

Fix posts at convenient distances from a south wall, with suitable ropes to support movable light canvass, so that some plants requiring some protection from bad weather may be sheltered. It works well with apricots, peaches, nectarines and many other fine fruits.

THE LADIES AND THE GARDEN.

M. Louvin appeals to the ladies to cultivate fruits and flowers. He touches a great question. Deprived as they are of exterior influence in society, they can cultivate the gardens and dispense gracefully the charities of the domain, while the lords of creation, persecuted by ennui, fly to clubs, theatres, halls, for change of faces and places, looking for that happiness in this chase, when the real good is at home with *her*. The ladies have always shown an almost insurmountable fondness for the home and the garden, instead of the futile city pleasures pursued by the men.

The *Prairie Farmer*, of Chicago, gives a drawing of a mammoth pear tree growing in Knox county, Indiana, one mile east of Busseron station, on the Evansville and Crawfordsville railroad. It is supposed to have been a riding switch given by Mrs. Small, near Vincennes, to Mrs. Ocletree, about fifty years ago.

It is now 60 feet high. Branches, 118 feet in diameter. Trunk 11½ circumference, but only five feet long. Some of the lower branches 5 feet circumference. One hundred and twenty-five bushels of pears a season. Two hundred head of cattle can find shelter under it.

FAWKES' STEAM PLOW.

His exhibitions at Lancaster and Philadelphia were perfect triumphs. At Lancaster a lady presented him with a rich and elegant wreath, woven with excellent taste, and bearing the inscription, "Presented to Mr.

Fawkes by Mrs. M. E. Cormeny, as a token of her respect and high appreciation of the skill and science displayed in this Wonder of the Age, the Steam Plow."

Mr. William Lawton, of New Rochelle, exhibited some of his fine blackberries, and gave them to the members. He remarked:

I saw an article in Moore's Rural New Yorker, a most valuable weekly visitor, in regard to the second blooming of the Lawton blackberry, and I now exhibit a branch of bearing wood, which has been regularly to illustrate the habit of the plant in this respect.

The blossoms put forth very uniformly upon my acres of bearing plants, and remain for several days in unblemished white flowers, which, in contrast with the perfect foliage, is a most beautiful sight. In about two or three weeks after the fruit is set, a second set of shoots, upon the same bearing wood, put forth their blossoms, and perfect their fruit in September, and occasionally a few plants will ripen a cluster of berries in October. I should suppose that at least 10 per cent of my fruit will be gathered from the second blooming of this season. I may mention here that every berry upon my plantation ripens and is gathered, and I confidently expect to continue sending fruit to market during the whole month of September. It readily commands twenty-five cents for a quart box during the whole season.

Dr. Adamson, of the Cape of Good Hope, remarked that the modes of treating and of training the grape-vine in the Cape colony were probably, in some respects, peculiar to that country. Different varieties suited different kinds of soil and required different modes of support and of pruning. The grape from which the raisins of the country were made corresponded most nearly to that known by the name of Royal Muscadine. The berry was of a richer yellow, and sweeter, with a higher flavor than those found in our markets. Those vines, as well as the varieties used for making wine, are pruned short, the bearing spurs being cut back to two or three buds, and only three or four such spurs being left on each stump. The stumps stand about eighteen or twenty inches in height. Staking is entirely dispensed with, owing partly to the scarcity of suitable timber and partly to fierce dry summer winds, the force of which is avoided by keeping the plant as low as can suit its growth. The common wine of the country is made from a grape presumed to be the same as that of Madeira. This wine has never had a high character. Its manufacture is conducted carelessly, and a harsh taste is communicated by the use of the vapor of sulphur to check the tendency to acetuous fermentation. The sweet wines of the country are superior. The length of the bright dry summer favors the formation of sugar in the grape. The Constantia grapes are all well-known European varieties. Of these there are four, viz: Frontignac, Muscatel, Red and White, (the latter probably the Sweetwater,) and the Pontac, the wines from which differ somewhat in character and price, but all fetching in the market about thirty times as much as the common wine called Cape Hock or Madeira. The sweet wines growing in other vineyards approach closely to the Constantia, though far from possessing in the market the same character and value.

The above constitute the trade or stock grapes of the country. There are about ten or a dozen others which are generally trained on trellises for shade or for the table. The favorite variety for these purposes is known by title of the Crystal grape, the chief value being that it bears fruit later than others, and thus prolongs the season. All these vines are trained long, the bearing shoots being left about 10 to 12 inches in length. Very fine wines may be made from them, but they are rarely used for this end.

Prof. Renwick stated that, the manner of training and pruning the European grape vine depended upon climate. He had seen vineyards from Bonn, on the Rhine, to those of Mount Vesuvius. In northern France and in Germany, the vines were trained low, and required, when in leaf, no other support than poles, shorter than those used in hop gardens. Indeed the first vineyard he saw he mistook for hop grounds. He had been present at only one vintage, namely: at Vevay, in Switzerland. Here the vines were trained low. The fruit was delicious to the taste but the wine was not of high quality.

In northern Italy the vine was permitted to form festoons extending on either side to mulberry trees, which had softened the elms described by Virgil. The wine, when carefully manufactured, was often of high quality. In Tuscany, many of the wines were highly celebrated, although even less pains were taken in restraining their growth. In the neighborhood of Naples the vines exhibited a still more luxuriant growth, and yielded the celebrated Lachryma Christi, as well as the more exquisite wines of Cafri.

He believed that experience had led to the practice in all these cases, and that the custom everywhere was that which had been found attended with the best results. It might not be generally known that the European Sweetwater grape, at one time, was extensively and very successfully cultivated within the limits of the city of New York. Sixty years since there was hardly a yard in the region extending from Coenties' slip to Catharine street, and bounded by Broad, Nassau and Chatham streets, which had not its grape vine, more or less fruitful, according to the pains taken in its cultivation. In all successful instances the vine was trained to heights of 15 or 20 feet, on trellises.

THE LAWTON BLACKBERRY.

Mr. Wm. Lawton read an account of the second blooming of this variety of blackberries, from *The Rural New Yorker*, and in answer to the inquiry if such things were common, he stated that he thought ten per cent of his crop this year was from a second blooming. He also exhibited some branches to show the regular progression of fruit, some of it having been ripened and gathered, while other berries from the last blooming will not ripen till late in September. It is this peculiarity that gives value to this variety. He attributes a good deal of this to pruning; he cuts back the canes unsparingly, removing one-third of the length. Every shoot of the canes upon six acres of last year's growth is loaded with fruit. He commenced sending to market July 27, and expects to continue marketing through all of September.

The Chairman stated that the nature of the orange tree was to carry fruit and flowers at the same time, and that is also the case with the fig tree, and he thought that it might be possible to increase our own fruit productions by art—making plants more overbearing.

GRAPES.

He also gave some interesting facts about the cultivation of grapes at the Cape of Good Hope, where the practice is to prune back to three buds, and grow the vines in bunches near the ground, only twelve or fourteen inches high. A vineyard looks more like a Scotch turnip field than like one of our vineyards. When vines are grown over trellises only, they are trained to a considerable length, but for raising, always low.

RINGING THE VINE.

Andrew S. Fuller.—The result of ringing the vines in this vicinity proves that the fruit will ripen two or three weeks earlier. Of course it kills the upper part of the vine, but not until it has ripened its fruit perfectly. The ring of the bark is taken off down to the wood.

UNPRUNED VINES.

Mr. Provoost, of Brooklyn, said that he never pruned, except to cut away dead wood. His plan is to lay down vines and let them root at the joints, and then carry them up again, till he gets vines 30 or 40 feet long. He has got a barrel of juice from a single vine of black grapes.

The Chairman.—There is a law of proportion between branch and root to which more attention should be paid. In this country the proportion of root is apparently small, and that will account in some degree for the benefit arising from ringing vines. We need some experiments in this line to know what the proper proportion is.

Mr. Fuller.—Any training or distorting of trees may add to their immediate productiveness, but will destroy the tree, or that part of it distorted.

YELLOW SIBERIAN CRAB-APPLES.

Mr. Fuller exhibited some splended samples of Siberian crab-apple, of the yellow variety, grown by George H. Hite, of Morrisania, a gentleman of great taste in all horticultural matters, and whose garden is full of the most rare and beautiful plants. These crab-apple trees, independent of their value as fruit trees, are highly ornamental, the fruit hanging in long festoons. They are also valuable for preserving. Mr. Fuller exhibited a specimen of crab-apple jelly, made by Mrs. Hite, which was tasted and warmly commended.

THE STEAM PLOW.

Mr. Solon Robinson read a letter from H. D. Emery, of Chicago, with an extract of a published letter from J. W. Fawkes. Mr. Fawkes states that, in consequence of his engagements to exhibit his machine in operation in this city on the 21st of September, he should not be able to have it at the

National Show at Chicago, as has been stated in the newspapers. Mr. Fawkes requested that this statement be made.

GAS LIME.

Solon Robinson read a letter from Irwin Lanson, of Indianapolis, asking for information about the use of gas lime.

Prof. Renwick.—Gas lime may be used in the same way as any chalk marl, and will have the same effect and no other. There is no danger in using it for any purpose where carbonated lime is used in agriculture. The best thing the gentleman who writes the letter can do is to try some experiments himself, and report them for the benefit of others.

Solon Robinson.—There is an opinion prevailing that gas lime may be injurious to vegetation.

The Chairman.—I think that opinion is erroneous. There is no danger. In England, chalk is very beneficial on some soils, and this sort of lime will have the same effect.

BEAN CAKE FROM CHINA.

Solon Robinson read to the club a letter from B. Donnelly & Co., No. 3 William street, with samples of the Chinese bean cake, of which mention was made at a former meeting. This article is as hard and dry as oil seed cake, and very solid. It is said to be made of cooked beans, and to be very nutritious. It is also used in China as a fertilizer. Samples of Chinese cotton seed cake and oil cake were also exhibited.

Mr. Bruce—It will no doubt be remembered that some time ago Mr. Prince, of Flushing, asserted, at the Farmer's Club, that the birds of California had no song, and that the flowers were without perfume. Thinking this somewhat strange, the subscriber wrote to his sons in California, where two of them have been for over seven years, with every opportunity of observing, and yesterday I received the following answer to my enquiries:

"There are a number of singing birds in this State. The mocking bird for one, besides we have the bobolink, the blue bird, the yellow bird of each several varieties, some of them no larger than the humming bird; a sparrow that sings melodiously; the thrush, and a bird the English and Irish people here call the linnet. I have been in places where the singing of the birds in the morning and evening, by far exceeded any thing I ever before heard. We also have the jay, the goldfinch, the magpie; then there is the rosignol, I think from its note sings very sweetly, at night. The flowers here are in as great if not greater variety than with you, and the roots fibrous, tuberous and bulbous. The hills and valleys in spring time, surpass anything you can imagine, being a complete bed of most beautiful flowers of every hue."

Mr. Meigs mentioned the original unpruned Isabella vine, spreading some 30 or 40 feet on the side of a barn, with very large leaves and berries. That on being carried to Germany it was there soon discovered that this vine will not submit to the pruning, as the old European grapes do, but demands exemption from the knife. That some of our large growers begin to find this out, and that the vine must have space. That Mr. Cozzens, of Dobb's Ferry, when living in this city, found an accidental vine growing in his yard, he nourished it. After some time he bought his present farm at Dobb's Ferry, and transplanted his vine to it. A committee of the Institute has examined his fine vineyard and admired his *first love*, which now surrounds his dwelling in all directions, is an ample bearer and is the admired progenitor of the Cozzens vines, and one of its admirers was Washington Irving, who resided near it.

Subjects adopted for the next meeting,—"The best food for stock in winter," "subsoil plowing and draining," destructive insects."

Adjourned to Monday, September 12th, at noon.

H. MEIGS, *Secretary.*

September 12, 1859.

Present, 55 members. Rev. Dr. Adamson, of the Cape of Good Hope, in the chair.

The Secretary read the following translations and extracts from the last works, foreign and home, received by the Institute since the last meeting, viz:

[Journal de la Societe Imperiale et Centrale d'Horticulture. Paris, Juillet, 1859.]

PROCES VERBAL.

A letter from le Comte de Morny was read by the President Payen, announcing that the Empress Eugenie had granted the Cross of the Legion of Honor to M. Felix Malot, for his important services rendered to horticulture, and especially arboriculture.

A NEW MODE OF GRAFTING.

M. Forkert, of Prussia, (verbandlung des vereins zur Befoerd d Gartenbaues in der Preuss-Staaten,) has discovered it, and it has many advantages of importance. When a season is quite dry the escutcheon graft is often difficult, on account of the bark becoming too dry to peel from the wood, except for a very brief period. This is very troublesome where grafting is wanted in large establishments. Forkert's method makes the season immaterial, if you provide suitable buds, and besides the operation is very quick, and what is better, almost always sure. Make a place for the bud as usual, but lift a little of the wood under the bark, fix the bud and tie it on with woolen yarn enough to hold it on; then cover all up with something which will immediately harden in the air. Cold liquid mastic is good—so is collodion. The whole secret consists in a perfect and absolute exclusion of air.

The learned M. Koch indorses the method before the Horticultural Society of Berlin. He has tried it on hundreds of roses without a failure. It heals quicker and faster than our old methods. M. Forkert has perfectly succeeded on cherry and plum branches, nearly two inches in diameter (four centimetres).

Mr. Fuller said large, strong buds were required.

[Bulletin Mensuel de la Societe Imperiale Zoologique d'Acclimatation. Paris, July, 1859.]

The distinguished philosopher, M. Becquerel, of the Institute, gives an account of his grape nursery we consider worthy of notice.

"I have for many years occupied myself with the acclimation of southern grapes in the middle of France, at Chatillon sur Loing (about a 100 miles south of Paris). I have two or three acres surrounded by walls ten metres high (above 30 feet), and two metres thick (over six feet). It is in a valley defended from north winds by a little hill extending from east to west. This wall keeps warm all night from the heat of sun by day. I raise oranges in it.

"Among the grapes, I grow the common Muscat of France, Muscat of Alexandria, Chasselas, and many others. They ripen well, maintaining their true fine qualities, except the Muscat, which has not so much sugar or alcohol in it. I add sugar to the wine. When I gather the Muscats, I lay them on straw in the sun, as is usually done with what is called Straw wine; but I find it better still to keep them in a stove heated to 20° = 67° Fahrenheit, nearly—for a month, to lessen the water in them, and ripen them. I prepare the *must* as usual, and let it ferment with the pulp for fifteen days; then put the wine into casks, leave it until spring, then draw it off into other casks to ferment, which lasts about two years, more or less, according to the quantity of sugar put into the *must*. After this the wine becomes clear, very agreeable to the taste, and contains about twelve or fifteen per cent of alcohol, and greatly resembles our South Muscat wines. I intend next year to try some of my grape vines in open air, on a silico argillaceous humid soil, near a trimmed wood—a spot unfavorable now, but which by draining and by warming the soil by means of brick conductors laid four to five decimetres (sixteen to twenty inches) below the surface and covered with soil, and carrying heat from a fire-place, and also warm air in summer. The conductors connect with a small chimney at the upper end. These conductors are near enough together to warm all the surface soil sufficiently. I intend to make my conductors perform the drainage."

M. Guerin Meneville writes to us that he has, for the Society to distribute, cones of the Precious Pine, *Pinus pinea tenerrima*, originally from Naples, already acclimated at Toulon by our brother member, M. Aguillon, in his Eygontien garden. The seeds of this pine are as good to eat as the Princess almonds. He sends also several varieties of the sweet potato.

Dr. Rufz gave an essay on the acclimation of the best turtles, especially the famed sea turtle.

To be published by order of the Society.

The Revista trimensal de Rio de Janeiro (Quarterly Review), states that the first lamas or guanacos (not the same thing) were sent to Charles Fifth, of Spain, by Diego Garcia, the navigator, in 1527.

NEW FLOWER POTS.

M. Langlois makes them of zinc, in halves, the halves brought together and secured by clasps. They are varnished on the outside. They are convenient to examine the condition of the roots, and for transportation in halves, and for durability.

Mr. Fuller said that no metal pot was as good as unglazed porous earthen ones.

William J. Townsend, of Skaneateles, chairman of the Farmer's Club, there, exhibited teasels from his farm. He raises some millions.

Prof. Nash said that teasels were once cultivated in Massachusetts to a considerable extent, but an alteration of the tariff brought in those of foreign growth cheaper than they could be raised here.

Seckel pears on quince, grown by Geo. H. Hite, of Morrisania, were exhibited, and spoken of by Andrew G. Fuller as growing most perfectly.

Mr. Fuller exhibited the Fontenay raspberry, the branch full of fruit. He thinks it the best ever-bearing raspberry known.

THE ISABELLA GRAPE.

An animated discussion here arose upon the Isabella and Catawba grapes. Mr. Fuller said that the American Institute did not seem to realize that there were any other grapes grown than the Isabella and Catawba, as they offer no premiums for any other variety.

Mr. Pardee thought these two old sorts had yet to give way to new and better ones.

Mr. Provoost.—My Isabellas are in fine condition, and I keep growing seedlings, and have no fear of their ultimate success.

Mr. Fuller said that although the Isabella may flourish at the South, it is certain that it is failing here, and new substitutes must be looked for in time. One of the great difficulties of growing seedlings from any native fruit is to get it to vary from the wild sort. There is no difficulty in getting variations from the cultivated or improved sorts. When a variation is once obtained from any seedling, it is very easy to continue this variation, and produce something better.

Prof. Nash thought it important that the country should know if it is a fact that this variety of grapes is failing, or diseased so as to be more difficult to grow than other sorts.

Solon Robinson stated it as an incontrovertible fact that the Isabella grape is diseased, and that it is not worth while for any one to plant a vineyard of Isabella vines in their present unhealthy condition.

Prof. Nash and Mr. Fuller corroborated this statement, and mentioned several new varieties equally good and much more healthy.

Wm. S. Carpenter stated that he had taken much pains to grow them, and had not had a good bunch of Isabellas for five years. He had tried both close pruning and no pruning, and his pruned vines produced quite as well as the unpruned, which proved the assertion false that the failure is owing to injury from close pruning.

Mr. Proovost said that the vines must be reared by seedlings; he had planted Isabella seeds to get new vines.

Several persons replied that there was no certainty of getting the like from seed, since the blossom might be fertilized by pollen, carried from some other sort by the bees.

Mr. Pardee stated that he saw five distinct sorts exhibited at one Fair, all labeled Isabella. Of course these were seedlings, and though like the original, were not the pure sort.

The Chairman said that seeds were sometimes strangely mixed, and thus new varieties grown.

President Renwick stated the origin of the name of the Isabella. It was so named after Mrs. Gibbs, whose husband found it growing in North Carolina, who brought to Brooklyn in 1818.

Mr. Fuller.—It is not known that the grape brought from North Carolina was a seedling, or the original of the variety.

Mr. Pardee.—The best proof that the Isabella is not an ordinary seedling is its high character, so different from the wild fox grapes.

THE RED ANTWERP SEEDLING.

H. L. Stuart.—I have in my hand a short essay, prepared by a boy sixteen years old, a pupil in the Collegiate Institute at Cornwall, Orange county, N. Y., the principal of which has taken an active interest in promoting a taste for agricultural studies. I think this paper worthy the attention of the Club, but as the hour of adjournment has arrived, I will lay it upon the table to be read at the meeting next Monday, and I hope, if it gives satisfaction, it will be so noticed as to give encouragement to similar studies and productions in schools.

Adjourned to Monday, September 19th, at noon.

H. MEIGS, *Secretary.*

September 19*th*, 1859.

Present, 50 members. Rev. Dr. Adamson, of the Cape of Good Hope, in the chair.

The Secretary stated that Mr. Snow, of Wrest Park, England, had obtained from the Black Hamburgh, or Frankenthall, a new magnificent grape, with all the size and color of the original, but with the flavor of the Muscat.

Mr. Lawton, from the board of agriculture, read the new rules for the Farmers' Club.

Dr. Carpenter has remarked a striking difference between the growth of the apples and pears on the north and south sides of the trees.

THE PROPER POSITION OF GRAPE VINES ON A TRELLIS.

P. S. Joslin, Carbondale, Penn., writes:

"I have an Isabella grape in my garden, which last season was trellised over a frame, which gave the principal exposure of the vine to the south, the ends of the frame being east and west. It bore pretty plentifully, but on the end toward the east the grapes mildewed very much, until I picked off about half of the bunches, while the west end, which hung equally full, escaped without any mildewing. This spring I took down the frame, and set four posts about eight feet apart, north and south, and nailed slats upon them, and tied the vines to the slats. The vine does not hang so full this season, but has made an extraordinary growth of new wood, which I have left untrimmed. On the side facing the east, the grapes have been affected with mildew, while on the west side but very few have been affected. Can a reason be given?"

The chairman inquired what was the prevailing course of winds at Carbondale; that might account for the difficulty.

Wm. Lawton thought all vines should be trained and trimmed to suit their particular location.

Several other person spoke upon this subject, and it was thought to be a matter of a good deal of importance to have the vine so exposed as to avoid danger arising from disease, want of sun and air.

PRESERVING APPLES IN WINTER.

Solon Robinson—The same gentleman, Mr. Joslin, communicates the following information about preserving apples. He says:

"Mr. G. W. Browning, a respectable, well-to-do farmer in Abington township, Luzerne county, told me that, some few years ago, his trees hung exceedingly full of apples, and the limbs were bent nearly to the ground. He made his orchard a hog pasture, that they might pick up all defective fruit as fast as it fell. He had a sow that learned to pick the apples from the recumbent branches, and as they swung higher, she would rise upon her haunches and pull a limb down in her mouth, and shake off the apples. His fruit was all of good varieties, and hundreds of bushels would be destroyed if he did not pick it, or take the hogs out of the orchard. It was then five or six weeks before the usual time of gathering and he was afraid they would spoil. In the midst of his troubles, however, he concluded to pick them out of the reach of the hogs, and leave the others on the trees a while longer. When he came to market his apples, his late-picked were ripe, and must be used in the winter, while his early-picked kept sound until late in the spring, and brought a high price when other apples were all gone. Since that time he has picked his apples early, has had them keep until spring and early summer, and consequently they brought him the best of prices."

CURING POISONED SHEEP.

Mr. Joslin communicated another valuable fact. It is the earth remedy for a poisoned sheep. A pet sheep, poisoned with laurel, lay down upon a pile of fresh earth, where its owner was digging a cellar, and he was partially buried, and in half an hour got up cured. Having known deer and other animals to dig into and lay down in the fresh earth when bitten by snakes, and now witnessing this earth cure, he was satisfied of its remedial effect, and has since practiced it upon other poisoned sheep, by covering them with fresh earth, and cured some that were nearly lifeless, by keeping them in the ground an hour.

Prof. Nash—On my father's farm, in Massachusetts, many sheep were poisoned with laurel, and we sometimes cured them with shot, administered by the handful. This is a much better remedy. The shot we used were very small, and always cured, if taken in time.

R. G. Pardee—We have accounts of persons who have been cured of diseases by burrowing in the earth.

The Secretary—A celebrated physician in London, professed to effect cures by baths of warm mud, and put his patient into it, leaving his head, only, out, handsomely dressed, powdered, &c.

Mr. Kingsbury—On my father's farm, in Berkshire county, Mass., sheep that were poisoned were put on the ground of a dark cellar, and were frequently cured by the process.

CATAWBA WINE.

Solon Robinson—Here is a singular request, not in itself singular, but that it comes from Indianapolis, which is within a few hours' ride of the great wine-manufacturing city of Cincinnati. Yet the writer comes to this Farmers' Club for a receipt for making Catawba wine. Mr. L. E. Leming (the writer) says:

"I have tried the simple fermentation of the juice without sugar, and have succeeded in making a fine article of vinegar. It is, however, rather expensive vinegar. I would esteem it a great favor if your would give me a good recipe. I have heard that rock candy is good to sweeten with."

Mr. Provoost—I use refined sugar, and the best New Orleans; the refined is the best, however, and I use 30 lbs. to the barrel; put in the juice right from the press.

WATERING WINE.

R. G. Pardee—At a former meeting I stated that the less water put in the better the wine would be. I have since had a chance of seeing a large number of samples of wine tested, and the palm was given to a bottle of currant wine, as the best of all, imported and domestic. It was made of the common Dutch currant, after the following receipt, which I took the trouble to obtain from the lady who made it, for the purpose of communicating it to the world with our published proceedings.

RECEIPT FOR CURRANT WINE.

Mash the berries when ripe and sound; to a gallon of berries add one quart of water, and let it stand twenty-four hours; then strain through a sieve, and add to one gallon of juice three pounds of treble-refined loaf sugar; let it stand in an open vessel, and skim well until October; then cover for four or six weeks, and draw off carefully, and bottle, corking and sealing tight. It must be kept *till* it is old, to obtain the best degree of perfection."

Mr. Pardee thought that other fruit juice should be treated in about the same way, to obtain good wine. The water used is not a quart to the gallon of juice, but to a gallon of the mashed pulp of the currants, to wash out the juice, and a portion of this evaporates while the juice stands in an open vessel.

ISABELLA GRAPES.

Prof. Nash—We have conflicting testimony upon the failure of the Isabella grape. Now, what are the facts? Why, that we have several grapes of different character, all under the name of Isabella. Now, under this state of facts, one may succeed and another fail.

RINGING THE VINE.

Andrew S. Fuller, of Brooklyn, exhibited specimens of Isabella and Catawba grapes, to show the advantage of ringing to make them ripen earlier. The bunches above the ring are fully matured, while those below are entirely green. In ringing, take off a strip of bark quite down to the wood, an inch wide, after the grapes are set. Of course, it destroys that part of the vine above the ring, for the next year. To prevent rot, dip the branches in strong sulphur water.

Dr. Trimble—I girdled a vine, and got grapes earlier and larger. The fruit above the ring never mildewed nor rotted.

Mr. Fuller—The process is a most valuable one, and saves summer pruning. It does not injure the vine to cut into the wood. Grapes may be grafted successfully—a cultivated vine upon a wild root.

BUDDING

Can be done upon trees, when the bark does not peel, by fitting the wood carefully together. Shellac is the best material to cover a graft wound.

GRAFTS

Will keep equally well in good, lively sawdust or in moist earth, or perhaps charcoal dust is the best material. That is what the Dutch gardeners always pack their bulbs in when they really wish to have them live.

CULTIVATING RASPBERRIES.

Mr. Pardee read the following paper upon the cultivation of raspberries, prepared by Master Caldwell, a boy 16 years of age, and a pupil in the Collegiate Institute of Cornwall, Orange county, N. Y., under the charge of Alfred C. Roe, who is doing a great deal toward the introduction of agriculture and horticulture into our public schools:

"In the following article on the Antwerp raspberry, I wish to present a practical view of the manner in which the plant is cultivated, not founded on any theoretical reasoning, but on actual observation and experience. A deep, rich, and rather heavy soil, appears best adapted, though they yield largely on slaty soils, also. The land should be very deeply plowed, and heavily manured with coarse barn-yard manure, then thoroughly harrowed and furrowed, as for corn making; the hills four feet apart each way. Next, set in three or four plants in each hill, cutting off the tops close to the ground. This throws all the sap into the new shoots, making much finer bushes the following year, and requiring no stakes the first season.

It is immaterial whether the planting is in the fall or spring; if in the fall, a shovelfull of compost, say black dirt and manure, thrown on the hill after cutting down, is all the covering they need the first winter. The ground should be kept well mellowed through the season, plowing frequently, turning the furrow from the hill, keeping the grass and weeds well hoed from about the plants. In the early part of November the bushes are bent down and covered lightly with earth to protect them from the severe frosts of winter, and also from the effects of the March sun and winds. This is done by plowing between the rows to soften the earth, then bending the bushes gently down and throwing a few shovels of earth on the stalks. The tops should all be laid in one direction, as they are less liable to be broken on taking up in the following spring. Early in the spring, while the ground is yet frozen, draw on and spread over the whole ground thirty or forty ox-wagon loads of long manure to the acre. In the early part of April, the bushes must be carefully raised with forks, and the stakes (from five to six feet long), firmly driven into the center of the hills, and the bushes confined to them by tying—two or three ties, according to hight of the bush, and now plow and hoe thoroughly, keeping the ground mellow and free from weeds. The fruit commences ripening the last of June, and is picked daily for four or five weeks. The plow should be run through once or twice during the picking season, as the ground, being tramped by the picker, becomes hard, and the weeds will grow. As soon as the picking season is over, the stakes are taken up, and the old bearing wood cut out, thus giving the young wood all the strength of the roots. The ground must now be well plowed both ways, and thoroughly cleaned, and so kept until the time for covering again, when the surplus sprouts are taken up, and either set out or buried in the earth for spring planting.

"The usual price of the plants is $10 per thousand.

"The baskets hold one-third of a quart, and cost $25 per thousand. The picking costs from 75 cents to $1 per hundred baskets.

"When filled, the baskets are packed in boxes, holding from 50 to 150 baskets, and thus sent to market.

"The yield per acre varies, according to soil and cultivation, from 6,000 to 10,000 baskets, and, under very favorable circumstances, has reached as high as 15,000 baskets per acre.

"The average price per basket in New York market in 1857 was about eight cents; in 1858, eight cents; in 1859, six and a quarter cents. This is the wholesale price.

"In preparing for eating, the flavor of the berries is much improved by washing them in cold water, and allowing them to remain immersed, say ten minutes, before putting on the sugar. This makes them tender and plump."

H. L. Stuart spoke of the advantages of encouraging the preparation of just such papers as this in all common schools, in a short, earnest, impressive speech, which was received with marks of approbation by the large number of persons of both sexes present.

BEST WINTER FEED FOR CATTLE.

This question being called up, Mr. Gale, a farmer, formerly of Orange county, said that his plan was to feed his cattle early in the morning with the coarsest fodder. In stormy weather I feed the best of hay. There is no one sort of fodder that will keep a herd of cattle so well as a great variety of food, the greater the better. I feed my stock four or five times a day, making it a law to feed often and a little at a time. I would like to change the feed every day. On some pleasant days I feed nothing but the coarsest food. I feed my horses good hay all the time.

Prof. Nash.—The grand secret of feeding cattle is to give a great variety of food—as great as possible. Make your arrangements in summer to have a variety to feed with in winter. You may give your stock poor food for a few days without injury, but you cannot continue such food for any considerable time without serious detriment. The general principle should be to give an animal a morsel of very good food every day. They will then eat up your rye straw, pea-vines and other stuff, because they are all the time healthy.

The Secretary said that he had always been accustomed to a garden, and had laboured as hard as any man, and the result was as it is with all strong, hard working men—that strong food was necessary. I could not do a hard day's work by feeding on such light, unsubstantial food as chickens, turkies, birds, &c.; I required *pork*, *beef*, *turnips and cabbages*.

Mr. Thurber.—I used to put coarse fodder in the manger with good hay on top. They will then eat the hay first, and afterward the straw. In the morning I fed first good hay, and followed that with roots or grains, and always fed hay at noon, then turned the stock out to water and exercise. The refuse food I saved, and afterward sprinkled with brine, and put it back in the manger.

Mr. Gale.—It is a bad plan to reserve the coarse fodder for bad weather, because the cattle would then eat it for want of something else. There is a vast amount of good food wasted in this State for the want of knowing how to use it. I keep all my stock in stables as warm as I can make them. I would not feed cattle altogether upon timothy hay, if I had it, if I could get straw or other coarse food.

Prof. Nash thought the value of the fodder crop the greatest of all in the country.

Mr. Provoost gave his experience in favor of cooking food, and also of the high value that should be placed upon corn stalks.

Subjects for next meeting,—"The best food for cattle in winter." "Subsoil plowing and draining." "Insects destructive to crops."

Adjourned to November 7th, 1859.

H. MEIGS, *Secretary.*

November 7, 1859.

Present, 21 members. Mr. John P. Veeder in the chair.

Secretary Meigs read the following translation and extracts from works received since last meeting, from foreign and home, viz.:

[Journal of the Royal Agricultural Society of England, Vol. 20, Part 1, No. XLIII.]
Presented to the American Institute, October, 1859.

AMERICAN IMPLEMENTS, &c.

America now, by steam within ten days of us, is beginning to be visited by thousands of Englishmen, for business or pleasure, or for a home. Labor-saving machinery is a peculiar feature of domestic and social life there, and the immense work already done. In three-quarters of a century they have overspread a country little less than all Europe, dug 5,000 miles of canal, 16,000 miles of railway, and a half dozen towns rivaling in size and surpassing in magnificence any city of England, London alone excepted. Their mercantile marine is not inferior to our own—their lake and river and ocean tonnage included. They begin to rival us in foreign commerce, have supplanted us in the whale fishery. They give three million seven hundred thousand bales of cotton which goes far towards supplying the wants of the world. Where seek an explanation of all this marvelous result? Where! but in the free energies of the vigorous and ambitious race of which they form a branch. Here unskilled labor has 1s6d to 2s per day; there, 4s to 5s sterling.

There is now at Manchester an old rusty machine, constructed years ago, which appears to be identical with one of the most popular of the American sewing machines lately brought out! American plows, axes, clocks, churns, pegged shoes and boots, take our place at the Cape and in Australia. The American axe, first in importance, so well known in every timber region of the world! of surpassing effect in the hands of a backwoodsman! The stump extractor! The root puller! The farmer's furniture shaped by Blanchard's turner! an immense saving of labor. A stone breaker! The horse-power on inclined plains! The thrashing machine! a very great saving of labor. The grain cradles! Hay forks, rakes, dung forks, digging forks, five tine, cut out of a single piece of steel! The axe shovel! The scraper! All superior to ours. Their plow, a brass model of which was sent by their great president, Jefferson, to Sir John Sinclair, and which model is now in *possession of the American Institute at New York!*

The horses on northern American farms are superior to ours; have more blood and breeding than the average of English farm horses. His small farmer's team, a well broke, docile pair, drawing his "trotting wagon;" his sleigh; all made light and strong.

Such is the tone of the Royal Agricultural Society of England, on American work? The music is agreeable to our ears, for although flattering it is all true.

[Translated by H. Meigs, October 1, 1859.]

SERVICE RENDERED TO AGRICULTURE BY WOMEN.

From the discourse of Mons. Cubier, the elder, to the Society of Agriculture in Versailles, France, June 18, 1809, I extract the following:

"Through the misty dawn of early ages *woman*, the flower of the human race, has taken the earliest steps, and the most direct, in agriculture. Lifting the veil of fiction, Lo! Isis, Queen of Egypt, gave precious lessons on agriculture to her people, while her husband, Osiris, gave them law. Isis assumed the ox as the grand symbol of the farm, thus apis became an Egyptian god. (*Oh! the roast beef of our day!!*) Then comes the fertile, lovely island of Sicily, where *Ceres* was queen, and was deemed to be the mother of *Plutus*, the god of gold, because *agricultural crops* were worth it all. Ceres dwelt in Enna, one of the then finest cities of Sicily. Cicero describes it in glowing terms. Strabo (who wrote 1,800 years ago,) speaks of its delightful fields, meadows, &c. Diodorus Siculus, before that, praises it. Homer, long before, says, "this beautiful country was the first that produced wheat."

The *Minerva* of Athens, the Parthenon virgin queen, raised olives. *Flora* took care of the flowers. *Pomona* of the fruit. *Semiramis* gained renown by her lovely gardens. Woman has taken care of the garden and farm while man was *hunting* or *fighting* or *lazing*. Early Rome did all that. An empress of China introduced mulberry and silk. *Isabella*, sister of the European Charles V., married Christiern, King of Denmark, and first taught him how to raise good vegetables. The ladies of the court of the Emperor Rodolph, in the sixteenth century, studied botany and imported foreign plants. Mademoiselle Linnæus, the daughter of the great botanist, aided him, and so did Mademoiselle *Pommereuil*, for which Linnæus gave her name to a fine plant, the *Pomeruella*. Madame de Genlis wrote strongly in favor of the science. Rousseau enforces them in his "Emile."

A princess of Wales made a beautiful Chinese garden at Kew. Women often make the garden and farm flourish while their husbands are otherwise employed.

LIEBIG ON AGRICULTURAL SCHOOLS.

The technical part of an *industrial pursuit can be learned*. The *principles* only *can be taught*.

I had a school at Giessen for practical chemistry, analysis, &c. *Thirty years'* experience has taught me that nothing is to be gained by the combination of theoretical with practical instruction.

[*Note by H. Meigs.*]—The above is about the amount of the experience of the last half century in agricultural schools. The Institute of France caused an examination to be made some ten years ago, of the working of such schools throughout Europe. The report constituted an octavo volume, and fully confirms the remarks above by Liebig. The great school of Von Thayer only flourished while he presided.

JAPAN WAX.

The London Journal of Arts of July 29, speaks of the recent extension of imports, amounting to cargoes of hundreds of tons.

A tree bears berries of wax, resembling when dry, dried grapes. The wax is of the *Anacardiaceæ* family, the *Rhus succedanea*. It is a medium between beeswax and vegetable tallow. Such as the Bassia butter, Borneo vegetable tallow and *Cocum* butter, &c. Huber says, bees convert sugar into wax. This Japan wax is softer, more brittle and fatty than beeswax, kneads easily, melts readily at 40 degrees Centigrade, about 98 degrees Fahrenheit; contains twice as much oxygen as beeswax, &c.

SALT ON CULTIVATED LANDS.

Mr. Aycrigg.—The result of the following experiment has convinced me that, on my land, five and a half bushels of salt to the acre, is at least not injurious to any garden crop, and that it has entirely driven off the striped melon bug, and some subterranean insects for the last three years. I state the case in detail, including part that others may think of some importance, although I may not so consider it.

In 1856, I planted a variety of garden vegetables in part of an ordinary field without any especial preparation. Nothing grew well, as the ground was not in as good condition as I supposed. The striped melon bug cut off nearly all the watermelons, muskmelons, &c., although I sprinkled ashes and powdered lime over the plants. A patch of Osage orange drills, making together perhaps a mile in length, was filled with black beetles; as I found on digging up a short distance, occasionally, to see if the seeds had sprouted. In a short time, nearly every drill (perhaps there was no exception) could be traced by the mole burrows. The mole tracks were visible in every direction over the rest of the ground. Not a single Osage orange made its appearance. Probably because the seed had been extracted from the balls by means of hot water, and were therefore worthless except that they caused an examination, which showed the condition of the ground.

All farther attention to this garden (if it deserved the name) was abandoned.

In the spring of 1857, a new spot was chosen a short distance from the former, with the same description of soil. It is a very fine, sandy loam, such as is used by moulders for their castings. In early spring the entire place was dressed with salt, broadcast at the rate of (2¾) two and three-quarter bushels to the acre. This part, intended for a permanent garden, was then heavily manured, plowed and harrowed. Then a second dressing of two and three-quarter bushels of salt, making together (5½) five and a half bushels to the acre. Everything, excepting potatoes, did very well, some things remarkably. From the experience of the previous year, some of the melons were secured by the open boxes, others planted in sods in closed boxes, others were left to chance. All did equally well. Not a striped bug made its appearance, although my neighbours were troubled as usual. There was none last year, nor this year.

Again, the choice food of the mole must have nearly been cleared out since the marks of the mole are rarely seen.

Again, in the fall of 1857, a part of this ground was trenched two feet deep, reversing the soil, and well manured in the spring of 1858. On this portion, and extending a short distance over the adjoining ground, long black beetles made their appearance in great numbers for a short time, eating the leaves of the potatoes. They were not found far from this part of the garden. But the potatoes (Mercers) were not saved by the salt, as they rotted badly.

While on the subject of salt, I will mention that the muskmelons raised on this ground were not only abundant and large, but in flavor at least equal to the best that I have tasted. Imagining that I could detect a slight flavor of salt, I tested some of the filtered juice with nitrate of silver and ammonia, and found an appreciable amount of chlorine. I hence infer that salt applied to the ground improves the flavor of the muskmelon.

Again, last summer I saw a strawberry patch that appeared in excellent condition. I was informed that it was ten years old, very prolific, and superior in flavor. Its excellence was attributed to salt, of which it receives an annual dressing in the fall.

GAS LIME ON CULTIVATED LAND.

In the use of salt, I have stated that the potatoes rotted badly. I do not attribute this to the salt, for the case was the same with those that used no salt.

The cause of the potato rot being unknown, may it not be analagous to the Oidium on the grape? and may not the same means effect a cure? If so, the cheapest form of sulphur is in gas lime, and this may answer the purpose. I have tried the experiment, at the rate of 30, 50, and 75 bushels to the acre, in diagonal strips of about forty feet wide, over the garden and potatoes, leaving intermediate strips undressed, and I cannot see the least difference either last year when it was applied, or this year.

Last year there was scarcely a rotten potato to be seen, either with or without the gas lime. This year, on the same ground, with seed from last year's crop, there are many rotten, both with and without the gas lime. Still the question may be raised whether the partial application last year may not have protected the whole from the strong scent of sulphureted hydrogen, driving away insects, if that be the cause, as some suppose. If so it would require an annual application in smaller quantities.

From this experiment, we learn at least that gas lime may be used on plowed ground and harrowed under, at the rate of seventy-five bushels to the acre without *injuring* vegetation. This, I feared, might not be the case, but determined to try. It may have been inert in my case, because the land may already contain sufficient lime and sulphuric acid.

The gas lime experiment was carried farther than above related, over young grass sowed the previous year. It was applied at the rate of fifty bushels to the acre, on the 26th of April. The color immediately began to change. On the 30th, there was a yellow streak (showing the line of the lime as spread on each side of the wagon with a shovel) of about forty feet wide. Still it was only bleached by the sulphureted hydrogen, and not killed even where pressed down by a handful of lime. By the 26th of May it had regained its color.

Subjects for next meeting ordered,—"Fences;" "Best method of preparing vegetables and fruits, and preserving them in winter, for men and animals."

That on the 21st inst., the Club will discuss the question of Agricultural Fairs in the vicinity of this city.

PEACH BORERS.

By Solon Robinson:—

An inquirer asks: "Is there any way to kill them effectually, without picking them out? I have done this, but in cutting away the bark to get the grub, have nearly, and sometimes quite girdled my trees; or is it better to take off all the outside bark and scrape the gum clean out of the track of the grub?"

JOINT CLAY.

The jointed clay, when picked or spaded up, falls into square particles, varying from a quarter to three inches square. The seams dividing it are supposed to carry off the moisture, and leave the earth dusty below the soil. It is an institution of our soil all over this county (Lee), at least, and State, so far as my inquiries have extended. There is immediately under the subsoil, or rather a continuation of it in jointed clay, said to contain much lime, which, in very dry seasons becomes very dry and dusty to the depth of ten feet, so that the dust will fly at the stroke of a pick; of course, this has a bad effect on young trees. How can it be remedied? Of whom can I obtain some Bush Alpine strawberries; and what will they cost per 100 plants?

HOW TO WATER MELON HILLS.

Dr. Vanuxem, of Shrewsbury, N. J., says: Set a flower pot in the center of each hill, and every wash day have the suds saved and poured into these pots and left full to gradually soak the roots. He first used a stick to make holes in the hill and fill them, but thinks the pots better, and that either plan is better than the usual way of watering garden plants. For strawberries set in ornamental mounds, this plan of watering by a flower pot will be good, but it should be filled each day instead of once a week.

A CURE FOR TREE-BLIGHT.

Charles F. Raymond, of Norwalk, Conn., thinks that he has discovered a very simple way of curing the blight of peach trees, pear trees, apple trees, and perhaps potatoes, which he is willing to communicate to the world for a moderate consideration. If any one is disposed to investigate the matter, let him address Mr. R., and if the remedy is valuable to the world, there will be no difficulty in raising a sum for a suitable compensation for such a boon to fruit-growers.

OLD ORCHARDS—CAN THEY BE RENOVATED?

The following letter of C. S. Green, of Ralston, Penn., I will read in full, and hope that some of his questions can be satisfactorily answered, since a great many others are equally interested. As it is dated "8th mo., 27th, '59," I suppose it is from one of the Society of Friends.

"Not having seen anything in the discussions of the Farmers' Club that exactly hits the complaint, I wish to ask you what to do in order to renovate an old apple orchard. We have an orchard containing forty large trees, now about thirty years old. The fruit is mostly seedling, and worthless. We this spring had them trimmed of dead limbs and suckers, and 500 grafts set in the tops of the thriftiest, and are now in doubt whether to have the ground plowed and manured, or to put the manure (stable manure and ashes) around the trees on the sod. It has not been plowed for many years. The trees are much covered with moss, and since the trimming have again put out suckers. Do these injure the growth of fruit? What shall we do with the trunks and limbs that have moss on them? The trees still bear a little, but probably not one-tenth of what they would produce if we could do just the right thing. I would remark that this is a first rate climate and soil for apples, and young trees uniformly do well. A little light on the subject will much oblige."

Dr. Knight.—In the first place he must get rid of the old moss by scraping, and also by burning what he scrapes off. He should also plow the ground and then manure it, though it would do some good to put the manure on the surface.

Adrian Bergen thought cultivation and manuring would remedy the difficulty.

The Chairman said that he would use lime, ashes and cold manure, dug into the sod late in the fall, or after it had been dug and frozen. I am told that the Germans remove the sod to let frost affect the roots. I use strong caustic, whale oil soap and cow ordure, and sand as a wash to remove all moss, &c., which is very important.

Dr. Knight.—I think it important to break up the sod, and also to clean the tree perfectly before manuring with anything.

Mr. Bergen.—In young trees we may manure too much, but not in old orchards.

The Chairman.—I would not have young trees branch lower than six feet of the ground.

THE STRAWBERRY APPLE.

A sample of the strawberry apple was presented, and spoken of as a variety worth consideration. The fruit is of small size, and of a strawberry color in the flesh.

WORMY PEARS AND QUINCES—IS THERE ANY REMEDY?

Doctor E. H. Vanuxem, of Shrewsbury, N. J., has tried the sulphur remedy—that is, boring a hole and filling it—in a pear tree that produces none but wormy pears, and has also thrown lime over the blossoms, all to no good purpose, and now as these published remedies have repeatedly failed, he wants to know what next. His quinces are also affected like the pears, and he has tried the sulphur and lime, and also salt and urine at the roots, but it does no good. Can anybody tell what will? If so, let them send in their story of how to do it.

THIRTY-FOUR SORTS OF BEANS FROM ONE.

H. J. Finley, of Davenport, Iowa, sends us what appear to be thirty four sorts of beans, which, he says, all originated from the early China bean. The first time he planted the China the product was seven parts like the seed and three parts pure white. From a second planting the product was about five parts China, two parts white, and three parts of all colors, like those in the papers which he has sent for the members of the Club to experiment with. The white and blue colors proved to be climbers, and the others all like the original Chinas. Mr. F. says there were no other beans growing within a quarter of a mile, except some Lima beans, and they show no mixture. He sends them to us because to him it is a new freak, though he says it may not be to others, and if not, perhaps some one can account for it.

VOLUNTEER TURNIP SEED.

E. A. Roby, of Burlington, Racine county, Wis., answers the question discussed some time since by the Club, about volunteer turnip seed, that it will produce a good crop. The seed grew upon small turnips that stood out all winter.

Now, this may be true, but it is a plan of growing seed that can not be commended, since like produces like, and must do so in this case at last. I would select the very best turnips, beets, carrots, cabbages, &c., to reproduce from.

SUGAR-MAPLE SEED.

Mr. Roby wants to know if there is any peculiar way of treating the seeds of sugar-maple to make them grow. I answer yes: the way peculiar to nature. Plant them in the very surface of wood mold, and cover the ground with leaves.

THE PLUM TOMATO.

I present to the Club a small box of fruit from Fond du Lac, sent to us by Ruth Lynde, of New Bedford, which she calls the Plum Tomato, and says the fruit is agreeable to eat out of hand, and also good for sweetmeats. This sample was grown by Mrs. John B. Macy, who could not give the history of the origin of the variety. She also sends us some Orange watermelon seeds for distribution.

GRAPES.—WINE-MAKING DIRECTIONS.

Luman Stevens, of Manchester, Mich., says that he has made wine for several years, of excellant quality, from Isabella grapes, by the following process: "I mash the grapes and let the pulp stand in an open vessel a day or two, and then press out the juice, and add four pounds of refined sugar to each gallon, stirring it thoroughly until the sugar is dissolved, and then put it in casks for fermentation, without water, and it works entirely clear, and has no look nor taste of muddiness after it is racked off and bottled, and obtained a little age. My grapes never mildew, though I manure the vines richly, and never trim off any but the dry branches, being satisfied that that course is suitable to the Isabella. My vines are protected on the north and west."

GAS-LIME.

"Will sandy loam be improved by an application of gas-lime; or is it beneficial to any soil; and in what quantity should it be used?" These questions come from Mr. Sandford, of Erie, Pa., but there are multitudes of others who would like to be answered as well as the writer of this letter. Now, who can speak and say "I know?" I can guess, but that is not the sort of information wanted.

THE GREAT FENCE QUESTION.

It was agreed that this question should be discussed at the next meeting—Joseph Blunt agreeing to present his views, with the laws extant upon the subject of fencing.

WINTER FEED FOR CATTLE.

This question, adopted at a former meeting, was called up, and elicited some discussion, and was continued, with the addition of "the best food for man, and the best manner of cooking it," which will be discussed at the next meeting.

Mr. Lawton thought the greater the variety of food for cattle, the better. His method is to cut all hay and give four or five pounds at a feeding, three or four times a day, with roots, &c.; parsnips, carrots, turnips, beets, all cut small. The great importance of cutting food is to save the old cows the labor of mastication.

The Club then adjourned. H. MEIGS, *Secretary*.

November 14, 1859.

Mr. John D. Ward, of Jersey City, in the chair.

The Secretary, Mr. Meigs, read a number of interesting papers upon miscellaneous subjects.

STEAM PLOWS AND DIGGERS.

First, a paper by John Algernon Clark, of England. In 1846 a patent was granted for an armed cylinder, to disintegrate the soil. In 1847 and 1849 other patents were granted in England for the same purpose. None of these plowed the ground, as we understand plowing, but some of them worked over about nine acres a day. In 1855 another patent was granted that worked six acres a day. In 1857 another machine, that carried its own rails, was patented. In 1853 a Canadian inventor patented a land digger. A second patent of 1857 was granted for a digger, but it did not pulverize over one and a half acres a day. As to the necessity of the pulverization of the soil, Voelker says that is of the utmost importance. The Canadian digger was further improved and steam applied the present year; and so was Croskill's digger also improved, and several other digging machines were brought out, one of which costs $3,500, and works well, but only six inches deep.

CRANBERRY CULTURE.

The Secretary read a paper touching the cultivation of cranberries upon Long Island. The average crop is sixty bushels per acre. There is not the least difficulty in producing this crop, and making it a very profitable one.

DRAINING THE HACKENSACK (NEW JERSEY) MARSHES.

John D. Ward.—The work of draining and improving the Hackensack marshes, in New Jersey, may, perhaps, at first sight, be thought out of the range of subjects which properly come under discussion at the meetings of the "Farmers' Club" in the city of New York; but when it is recollected that some portion of the tract proposed to be improved, is situated within five miles of the city, and that the average distance to be traveled from all parts of it, to reach Washington market, is less than eight miles; and that, if properly drained and cultivated, the whole of that now useless and repulsive region may be made more productive than any other equal extent of cultivated land, from which New York can receive milk and vegetables, it will be perceived that the citizens of the great metropolis have at least as deep an interest in the matter as those in its more immediate neighborhood. The means of supplying the markets of the city with the more perishable articles of food, so largely consumed, would be much increased; the supplies would be more regular, and the prices less variable, than when brought from greater distances, by those less intimately acquainted with the state of the market; and the cost to consumers would rather be diminished than increased.

The following paper was originally drawn up for the purpose of showing to some persons whom the writer wished to engage in the undertaking, the probable cost of the work, and the advantages which might be realized from it, if properly executed. Having failed to interest a sufficient number in the project, to render it expedient to undertake it at the present, the plan is presented to the "Farmers' Club," with the hope that it may not be forgotten; but that, at some not very distant day, it may be executed, and a miniature Holland grow up on the banks of the Hackensack.

The large amount of low meadow land, or marsh, in New Jersey, lying west of Hackensack river, in Hudson and Bergen counties, has frequently attracted the attention of capitalists and cultivators, who have supposed that it would, if embanked, drained and properly cleaned, furnish the finest situations within reach of New York and adjacent cities, for producing milk, vegetables, and other articles required for daily consumption by the large and constantly increasing population which they contain. Its peculiar fitness for the production of such articles, and close proximity to market, where almost unlimited quantities of them could be disposed of, has led to several ineffectual attempts to reclaim portions of the tract; but the plans proposed for the purpose were imperfect, and on that account, or from want of pecuniary means, or practical skill, none of them appear to have been entirely completed, though several dilapidated sluices and small half-filled water courses remain as evidences of former misdirected labor.

These failures, although natural results of the plans pursued, are not o such character as to render the success of the enterprise doubtful, if a proper plan be adopted, and the work carried on with the requisite energy, intelligence and engineering skill.

In England and in Holland, tracts vastly more extensive than the one under consideration, and presenting much more formidable engineering difficulties, have been reclaimed, and rendered not only productive and useful, but beautiful.

On the eastern coast of England, in Cambridgeshire and Lincolnshire, upwards of 125,000 acres of fen lands, similar in many respects to the Hackensack meadows, are embanked, and the whole drained by seventeen steam engines, of the aggregate power of 870 horses, the water being lifted from three and a half to six or seven feet. One of the commercial effects of the drainage works there was to raise the price of land, affected by them, from £10 per acre to £50, £60, and even £70. In July, 1857, Mr. Henry F. French, the author of an excellent work upon "Farm Draining," lately published in New York, visited the Lincolnshire fens, in company with some friends, and found wheat growing upon some of the drained lands, which they estimated would yield fifty-six bushels per acre.

A recent, and probably the largest drainage work ever undertaken, was reclaiming the bed of Haarlem lake, in Holland. The lake itself covered 44,727 acres, (about seventy square miles,) and received the drainage, or surplus water, from 173,128 acres of surrounding land—the whole extent of which is now artificially drained by machinery; and some portions of the ancient bed of the lake are twenty-six feet below the level of high spring tides. The cost of lands outside of the lake, required for embankments and other purposes, was £58,880 sterling, or nearly $300,000, and the quantity of land actually gained for cultivation is said to be about 56,000 acres. When the drainage was completed the land was sold, and produced £16, 2s, 8d per acre, (about $80,) this price defraying the whole cost of the work, and leaving to the government a small amount of profit. The land is described as *magnificent*.

These examples are sufficient to show, not only that the drainage of Hackensack meadows is practicable, but that the work, if properly executed, will almost certainly be productive of beneficial results to the proprietors of the lands improved, and to the community at large—an unhealthy, unsightly, and almost totally useless tract will, by draining and cultivating, be made useful, beautiful and healthful.

The quantity of land on the west side of the river, requiring to be drained, has been variously estimated. David B. Douglass, in 1841, in a report to John G. Costar, respecting the improvement of that portion of which Mr. Costar was then the owner, said that he "found it difficult, upon examination, to realize more than twenty square miles, or 12,800 acres," in all. Others have estimated the quantity at 16,000, and some, who probably included the low lands on both sides of the river, at 30,000 acres. Its extent is not clearly defined on any map hitherto published, and can be ascertained correctly only by actual survey. But if the quantity be set down at 13,000 acres, or only 200 more than the lowest computation, it will probably be near enough to the true amount for the purposes of a preliminary estimate of the cost of embanking and draining the whole parcel, and showing the commercial results, which, when completed, the work may be fairly expected to produce.

The embankment, upon which the track of the New Jersey railroad is laid, forms a very complete protection against the tide in Newark bay and Passaic river, at the southern end of the tract proposed to be drained, and will relieve the work of the expense of constructing and maintaining an embankment of considerable extent, which, although not perhaps where the draining engineer would have placed it, will serve his purpose very completely.

From an examination of several maps, it appears that an embankment of about ten and a half miles in length will be required, to extend from the point at which the railroad meets the Hackensack, to where the upland in Bergen county forms the river bank; and on the other, or western side of the marsh, at the foot of Belleville ridge, a catch-water drain of seven and a half or eight miles in length must be excavated to receive, and conduct to Passaic river, the water which may flow down the eastern slope of that ridge, and which, if not intercepted and conducted away before reaching the low level of the meadow, must be raised again by machinery; the cost of which operation may be saved, by intercepting it at such height, that it will flow to the river by its own gravity. If the embankments are so constructed as to exclude the tide from the bay and rivers, and the drain, at the western boundary of the tract, intercepts the water which now flows down the ridge to the meadows, the complete drainage of the whole will be effected by raising and conducting away that portion of the rain fall, which will be left, after deducting the amount required for the support of vegetation, and that which will be carried off by natural evaporation.

The whole amount of rain falling upon the tract may be set down at forty-eight inches per annum; and as none of this can flow away naturally, and as the evaporation from the soil will, in that situation, perhaps be at nearly the minimum rate, it will not be safe to estimate the proportion which will remain to be raised and disposed of by artificial means, at less than two-thirds of the whole, or thirty-two inches in depth per annum; and, as at the ordinary high water in the river, the tide rises to nearly the level of the present general surface of the meadow, and at low water is about four and a half feet below the surface, the mean height of the point of discharge may be taken to be the present surface of the meadow; and the mean lift, the distance which it may be found necessary to keep the surface of the water, in the main drain, below the point to which the surface of the land may subside when drained and cultivated. This will not vary much from four feet, which may be safely assumed as the mean lift; it will probably be something less.

The depth of water to be annually raised is assumed to be thirty-two inches, which, upon 13,000 acres, will amount to 1,510,080,000 cubic feet. This quantity may be raised four feet by a steam engine of fifty horse power, in 318 days, of twelve hours each; but as the rain fall is irregular, amounting sometimes to no more than one inch per month, and sometimes reaching nearly twelve inches, it will be necessary to provide means for raising at least two-thirds of this larger quantity; or instead of using a fifty horse engine, which it would be necessary to keep in operation a little more than twelve hours during every working day in the year, it will be proper to erect one of 120 horse power, which will accomplish the work required in the whole year, if worked 132 days; and could raise the eight inches of water, which it may sometimes be necessary to dispose of in a single month, in a little less than 11½ days, of twelve hours each; or if worked continually, as it might be in cases of necessity, in about 5¾ days.

The proportion of steam power, to the extent of country to be drained, will, when the low lift is taken into account, be found sufficient to afford perfect security against danger, or inconvenience from accumulations of water in any part of the tract, provided the channels for conducting it to the draining wheels are made of proper dimensions and kept in proper condition.

The cost of a steam engine of this size, with boilers, engine house and draining machinery complete, at the English computation of twenty shillings sterling per acre, will be $65,000. But as the execution of such works is not so well understood here as there, we may add for contingencies $10,000, making the cost of the whole, when in operation $75,000, or $5.77 per acre nearly.

With respect to the number, dimensions and arrangement of the ditches and larger drains and water courses, for collecting and conducting the water to the machinery to be raised and discharged, a pretty wide range has heretofore been indulged in by draining engineers, the proportions of the surface taken up by them varying from $\frac{1}{10}$ to $\frac{1}{32}$ part of the whole. It is proper to remark, however, that the larger proportion was used when wind-mills alone furnished the power for raising the water; and as these were irregular and uncertain in their action it was necessary to provide means for storing the large quantities, which sometimes accumulated, in consequence of a lack of wind to set the mills in motion. With steam power to perform the work, provision for storing any considerable quantity of water became unnecessary, as the engine could be started whenever there was work to be done. This substitution, of steam for wind, therefore led to a gradual reduction in the capacity of the drains, until at Haarlem, the last and greatest drainage work, the proportion of surface occupied by them is only $\frac{1}{32}$ of the whole. This appears to be sufficient, even there, where they receive a large amount of water from surrounding lands; and it is believed that a still further reduction may be safely ventured upon at Hackensack, where it is intended to exclude all water, except that which falls upon the land, in the form of rain. A careful survey and examination, of the whole tract, must be made before the number, sizes and situations of these can be fixed with any certainty that the arrangement will be a useful or proper one. But for the present purpose, of estimating their cost, it is assumed that the Haarlem proportion will be adopted, and that $\frac{1}{32}$ part of the whole tract will be occupied by drains and water courses, and that these must have an average depth of four feet, or one yard and one-third—$\frac{1}{32}$ of 13,000 is 406,25 acres, the excavation of which $1\frac{1}{3}$ yard in depth, will require the removal of 2,621,666 cubic yards, and will cost, at twenty cents per cubic yard, $524,333.20.

A catch-water drain of eight miles in length, increasing in breadth and depth, from its head to the place of discharge, at the river, and having a mean cross section of twenty-seven square feet, will require the excavation of 42,240 cubic yards, and at twenty cents per yard, will cost $8,448.

Ten and one-half miles of embankment, averaging five and one-half feet in height, eight feet in width at the top, with slopes of one and one-half in width to one in height on the outside, and one to one on the inside, will require about 9.1 cubic yards, in each yard of its length, or 168,320 yards in all, and will, at twenty cents per yard, cost $33,726.

To work the steam engine, including attendance, fuel, oil and other stores and repairs, will cost from $6,000 to $6,500 per annum, or fifty cents per annum, per acre.

For clearing and repairing drains, and preserving embankments in order, no account of the current expenditure required has been found in any work consulted; the estimate for this must therefore be taken as conjectural, but it is believed that it can scarcely exceed twenty-five cents per acre per annum, or $3,250.

As there is little probability that any single capitalist, of sufficient means, will undertake the work, the only other mode of proceeding, which appears practicable, is to obtain a charter for a joint stock company, that shall have power to purchase the land, drain and fit it for cultivation and then either sell, or lease it to occupants and cultivators, subject to a small annual assessment for maintaining the work, and raising and removing the water. The capital which this company should be authorized to raise ought not to be less than $500,000; and it should be permitted to hold real estate worth $3,000,000: it should, however, be allowed to commence operations when one-half its capital, or $250,000 shall be subscribed and paid, or secured.

The land, in its present condition, is almost valueless; but if wanted for the purpose of improvement must be obtained at such rates as the owners may choose to demand, the work not being of that character which would authorize the taking by legal appraisement. The price named in the annexed summary ($20 per acre,) is believed to be higher than has at any time been paid for it, unless when sold in lots of a few acres each, in particularly favorable situations: and much more than any income which could be derived from it would warrant a purchaser in paying, unless for the purpose of improving and rendering it productive.

But the propriety of undertaking the work will very much depend upon the terms which can be made with the present proprietors, either for the absolute purchase, or for receiving the land in payment of subscriptions to the capital stock of such corporation as may be erected for that purpose.

Summary of Estimates.

13,000 acres of marsh land, at $20 per acre,..............	$260,000 00
Steam engine, 120 horse-power, engine house, boilers, draining wheels, and machinery complete,..................	75,000 00
Catch-water drain, 8 miles in length,....................	8,448 00
Embankment, 10½ miles,..............................	33,726 00
Drains, water-courses, &c., $\frac{1}{32}$ of the surface, or 406.25 acres, 4 feet mean depth, at 20 cents per cubic yard,..........	524,333 20
	901,507 20
Engineering and contingencies,.........................	90,150 72
	$991,657 92

As the land on Belleville ridge is valued at from $200 to $400 per acre, and that on the western slope of Bergen hill sells at from $400 to $ it is believed that Hackensack meadow land, if properly drained and prepared for cultivation, would readily bring, in the market, $250 per acre; as in addition to its proximity to New York and Newark markets, the soil would, for a long time require little, if any manure, and its cultivation would be cheap, being light and easily worked.

Value of 1,300 acres at $250,.........................	$3,250,000 00
Cost when improved,................................	991,657 92
Profits,..	$2,258,342 08

THE FENCE QUESTION.

This question was called up, and Joseph Blunt was requested to open the discussion. The following is the substance of his remarks, which were listened to with the most marked attention by an assemblage made up, in a great measure, by men who have a strong pecuniary interest in this important question. Mr. Bluut is a well known lawyer of this city, whose legal opinions are entitled to much respect. He said:

The expense and labor of fencing in this country, periodically renewed, render it one of the most important subjects that can engage the attention of the American farmer.

Fences in proper positions have their uses, and may be so constructed as to be made ornamental as well as useful. They should, however, be confined to what is necessary, such as are required for gardens, pastures, and road fences. No interior fences, except for pasture, are required on a farm. Division or boundary fences are made necessary by the act of 1838, an act the policy of which may well be questioned. Beyond these they should not be extended, and such a curtailment would diminish the amount of fencing at least three-fourths. In making pasture fences it is desirable that they should be so placed and formed of such materials as to furnish a shelter or protection from the northern and eastern winds. The American thorn, and some of the evergreens in this latitude, can be made available for hedges, and with an open ditch on the pasture-side they present a fence well calculated to confine the most unruly cattle. In some fields where stone abounds, fences often present the readiest mode of relieving the surface-land of an encumbrance. In such places fences may be made without being subject to the strong objection of enormous and needless expense, to which the farmers of this State are subjected by the existing system.

Fences are made from dead materials or living, as when planted in hedges.

They may also be classed as permanent, or requiring periodical renewals.

In either case they require annual attention, involving labor and expense.

The first cost of fences depends of course upon the materials employed, and the part of the country where they are built. The average cost, however, is the important point to be considered in the view proposed to be taken of the matter, and in order to illustrate it, I shall confine myself to the State of New York.

It has been estimated that there are in this State 15,000,000 of acres of inclosed lands, which, divided into fields of twenty acres, make 750,000 fields, requiring 120 rods of fence for each field, or 90,000,000 rods of fence in the State. The cost of this fencing varies from fifty cents to two dollars per rod—rail-fencing the cheapest in the first cost, though, perhaps, the dearest from its insecurity, and requiring constant attention and frequent repairs, will not last more than ten years, which may also be deemed the average duration of the ordinary post and board fence, costing in this part of the State not less than one dollar per rod. Stone walls are still more costly, though durable.

Taking the average cost of wood fences, which is the ordinary fence, at 75 cents per rod, and this is a low estimate, and we have a result of $67,000,000 for the first cost of fencing in this State.

This cost must be renewed every ten years, independent of the labor and cost of periodical repairs.

The annual cost of fencing in this State, over and above the cost of periodical repairs, then may be computed as follows:

Interest, at six per cent, of the first cost,	$4,020,000
The original cost, divided among ten years, is	6,700,000
Total,	$10,720,000

If this enormous expense were necessary, of course it must be borne, and cheerfully, as wise men should endure all that is inevitable. But when it is considered that it results from an unwise and erroneous system, no time should be lost in bringing about a reform.

The farmers in this country were formed and educated under the system of fences—a system founded upon the notion that a man is bound to protect his property by fencing out the world. That the law has no power; that a general respect for the rights of property has no existence; but that you must fence out all intruders, and guard your property with walls and fences, if you desire to enjoy it as your own. In feudal times, when might stood in the place of right, such a notion might very properly be entertained; and, in fact, we seem to have derived our system of fences from those days, when castles and battlements and fenced holds constituted the only protection to proprietary rights, and the warlike owners of those strong places acted upon the principle that all cattle within their reach were stray cattle, which they had a right to impound at pleasure.

The whole system is founded upon an erroneous notion. The law does protect a man's property. His real estate and its products are his, and they lie under the protection of the law, whether fenced or unfenced. Any man invading his land, either in person, or with his flocks or his herds, is liable for all damage. He has no more legal right to ravage, or to send his cattle to destroy his neighbor's unfenced grain, than he has to cut down his neighbor's unfenced woods. They are all equally under the protection of the law; and our farmers throughout the State should enforce that principle, and they wlll, by saving the periodical outlay of fencing, nearly double their net profits. The idea that cattle can be lawfully turned out upon the road to get their living upon the closely cropped road sides, and to be taught by hunger to break through and leap over any weak fence into a better pasture, is most injurious to the agricultural interest, as well as dishonest in principle. What would be thought of a father who should bring up his children, before instructing them in the principles of right and wrong, to get their living on the highway? And where is the difference, in a moral point of view, between the one and the other?

A man has no greater right to bring up his cattle in dishonest practices than he has to educate his family to live by theft. Let him teach a dog to snatch a lady's reticule from her hand, or a turkey from a poulterer's stall, and to bring his booty home, and the master would be held responsible by the law. But many seem to think that cattle may be brought up to habits of the same sort without any legal responsibility, and that the occupant of a shanty may keep a hog to be let out every morning to get his living by prowling on the highway, watching his opportunity to slip in open gates, or to insinuate his snout so as to open them for himself, and then, with his native instincts, and his master's principles, making your carefully-nurtured domestic institutions unfit for your employment. This is unsound reasoning, and the sooner it is corrected the better it will be for the farming community.

Men must be made to feel that domestic animals must be domesticated; i. e., kept at home; that a man has no more right to keep a herd of depredating quadrupeds than of bipeds. That if he wishes to keep domestic animals, he must take care of them, and be responsible for their conduct.

This is a desirable consummation. It is the law of the land, and would probably be adopted universally as practical law, were it not for a statute passed April 18, 1838, which denies to a person liable to contribute to the maintenance of a division fence, all right to damages incurred by reason of his portion of such fence being out of repair.

This act, however, is limited to division fences, and does not apply to any others. All road fences, and other than division fences, kept up by adjoining owners, fall under the general law, which does not impose upon the owner the duty of protecting his cultivated land from stray cattle.

That duty belongs to the owner of the cattle, and it should be so strongly enforced that farmers may feel that their lands, as well as their dwellings, are under the protection of the law.

To make that protection, however, effectual, some modifications should be incorporated in the statutes.

1st. All estrays should be liable to seizure by an inhabitant, and he should receive a suitable compensation upon delivering them at the public pound.

2d. Constables should be compelled, whenever required, to convey any estray to the pound, and they should then be entitled to such compensation.

(These provisions are now made law for some particular towns and for the whole county of Westchester, and are found effectual.)

3d. Estrays should be held liable for all damage done, and, if not redeemed should be sold, after proper notice to pay damages and expenses.

To make this principle effectual it must be asserted in a statute. Although the law would afford a remedy, it must be obtained at the end of an expensive litigation, and the statute of 1838, although intended solely to compel our unwilling neighbor to contribute his fair proportion of a boundary fence, has done its part in creating a doubt as to the legal obligation of the owner of trespassing cattle, by declaring that such obligation shall not exist in trespasses where the owner of the adjoining land has not maintained his share of the fence in proper repair.

This statute should be modified so as to compel, in the usual mode, a just contribution toward the expense of a division fence, but not by offering temptation and immunity to the owner of unruly cattle, to pasture them without legal responsibility, upon his neighbor's land.

Laws that resort to such motives ought never to find a place in the statute book, and only serve to illustrate the sarcastic remark of Oxenstoirn: "You see, my son, how little wisdom is required in the government of men."

The inconveniences of fences have been very well set forth in a communication made by Mr. Pell, at a former meeting of the club, and consist of:

1st. The expense.

2d. The obstacles they present to an entire cultivation of fields and to the transportations of manure and crops from and to the homestead.

3d. They promote the growth of weeds.

4th. They collect snow drifts on either side, and retard spring cultivation.

5th. They present a cover for the concealment of vermin.

6th. They render unavailable to the farmer 4 acres in the 100.

7th. They cause constant disputes between neighbors.

8th. They deform the beauty of the landscape.

In most countries in Europe, a different system prevails. In France, Belgium, Holland, and the best cultivated portions of the Continent, fences are generally dispensed with. In England, they begin to see the propriety of abandoning them. In visiting Nantucket and the valley of the Connecticut, we are struck with the beauty of a landscape devoid of fences. The beautiful country seats around Boston require no outer gates, and we hope to see the day when New York will be enabled to present the noble scenery which abounds within her borders, no longer disfigured by the innumerable fences that a mistaken policy has extended over the State.

Our rural system sadly requires legislative attention. Laws which should have the effect of saving even half of the needless expense of fencing would enrich the State more rapidly than the Erie canal. Had that great man whose active mind made that work part of your State policy been longer spared to us, he would, doubtless, have bestowed upon your home policy, benefits equal to those which his suggestive genius imparted to your system of internal commerce.

But since his departure, the rival parties of the capitol have been solely occupied in wrangling about enlarging and extending that work, and the superior economy which each claims in the construction of those improvements.

From their discussions you would infer that the sole mission of the State was to furnish channels of communication between the great west and the ocean, and that her own home interests could only be advanced except as auxiliary to that end.

In looking over the dreary details of legislative reports and discussions for the last 30 years, the reader is forcibly struck with the absence of what is called originating or suggestive statesmanship. Scarcely a measure of public policy which has not originated in personal or local interest is to be found in your statute book. It is for the farmers of the State to say whether this condition of things is to continue. Whether local grants and local railroads shall occupy all the attention of legislatures, or whether the rural laws, such as regulate fences, and those applicable to common roads (a system equally needing reform), shall receive some consideration.

In your own hands is your own destiny. You control the legislative power of the State.

Before your will the 20,000 majority of the city is powerless.

Let your will be manifested, and your interests will be cared for, and the improvement of your rural laws will soon be felt in the increased prosperity of the farming interests, and the augmented population of the rural districts.

Solon Robinson.—I have for many years been an earnest advocate of reform in the law, and the custom, which is stronger than law, governing farmers in relation to fencing. I have no desire to argue the question, whether it is more economical to soil or pasture cattle. I am for letting every one have his own way. It would hereabout be considered a very wasteful, slovenly sort of farming to set the hogs to gather a corn crop. Yet I have seen a thousand fatting hogs turned into a cornfield as soon as the ears began to glaze, and I am well satisfied that that was the very best mode of harvesting the crop. If it had been picked by hand, and husked, and put up in a crib, the market price would have been ten or fifteen cents a bushel; or else it would have been fed from the crib in a more slovenly way than if the hogs gathered it for themselves, and, with all, would not have produced any more money, if as much, losing all the labor of harvesting; and the stalks and shucks are not, in such localities, of value enough to pay for gathering. Now, how ready farmers in this section of this broad land are to cry out against such waste. But they are not yet quite ready to see the worst system of waste they are practicing. What can we do to enlighten them? How can we convince the owner of a stony farm that the very worst use that he can put those stones to is putting them into stone walls; frequently in this and the New England States, cutting up the farm into four acre lots. The only way to convince men of the folly of fencing is to show them the advantage of having no fence. But this the law and custom of the people both oppose. In short, because any neighbor choses to build stone wall, he would compel me also to build stone wall. If he does not come over upon my farm, armed with the law and its officers, to compel me to build interior fences—to cut up my land into what I conceive to be most inconvenient little inclosures, he does come along the line that divides our land, and insists that I shall build a fence to keep his cattle out of my crops, because he chooses to pasture his animals, and I do not. But this is not the worst iniquity of the fencing system. For I am compelled to fence the sides of the highway to keep the miserable, half-starved brutes of my neighbors from coming upon my land. This is the most iniquitous feature in all American jurisprudence. It is even worse than Virginia justice, as meted out to poor old Osawatamie Brown and his deluded followers. Then there is the excuse which malice and ignorance always can give for acts of folly and wickedness, while no man living ever could give any reason why he should compel me to fence against his cattle. I don't care what system of farming my neighbor chooses to pursue; he may let his cows run in pastures, or his hogs in his cornfield, if he likes; but I do care that he should insist upon my pursuing the same course. Let me illustrate; and as illustrations are always most forcibly made by reference to an actual state of facts, let me illustrate by my own case. I occupy a little farm of eight acres of the rough but costly land of Westchester county, a few miles out of the city. It is bounded on two sides by two roads, requiring 1,375 feet of fencing, and on the other two sides by two cattle-pasturing neighbors, requiring for my half of the fence which the laws of the State of New York require me to build and keep in good order, 530 feet more of fencing. Now to make a substantial stone wall, which is about the only substantial fence that Westchester county farmers do build, such as one would be willing to have near his house, is worth twenty-five cents a foot, and would make the first cost of an outside fence $475, and the annual tax for interest and cost of repair, and in time rebuilding, say ten per cent, which is $47.50 a year. What do I get for this annual and eternal tax upon my industry—a tax of nearly $6 an acre, or two per cent of its saleable value? Not one single iota. And however much I might be in need of pasturage, I would no more think of turning my cattle out to run at large within that inclosure than I would turn myself out, Nebuchadnezzar-like, to take the range of the fields. And I would just as soon turn myself out as a common highwayman, as I would turn any kind of stock into the road to prowl upon my neighbors, and pick up a dishonest living. And as for the honesty of the case, I think the highwayman has the best of it. He may have the excuse of necessity for saying "Your money or your life;" and I may yield which I think the least of. Not so with the man who turns his cattle out upon the highway. He sneaks behind the law, and says "Keep your fences up and your gates shut, or I will rob you, without any necessity therefor or profit to myself, of what has cost you years of toil to produce." Here, upon one side of my farm, is a poor tenant farmer, with one yoke of oxen, a cow, and some pigs, and scant pasturage, and he might have some excuse for pasturing the road; but he does not. The force of early education is against it. He is an Englishman. He does not come from a country guilty of such heathenish barbarism. On the other side, I have a neighbor who owns his land, and is abundantly able to pasture his pigs and cows; and so he does, and has for years—in the public road. I can't leave open a gate long enough to drive out, without being in danger of having my garden rooted up by Staats Valentine's old sow, or having some of my new fruit or ornamental trees destroyed by his omnipresent old cows. He claims it as a part of his inalienable right to pasture the highway. So it is, along his own fence, which is a very short one; but neither he nor any other man has any honest right to go one foot beyond. Turning cattle out to run at large within ten miles of the Central Park is an outrage upon common sense, a breach of good morals—an imposition upon neighbors—a contempt of Christ's maxim of "do unto others," &c., which can only be accounted for by a very false code of morals, grown up with some of the old settlers of this country, that law should, if argument wont, reform. And the division fence that I have been compelled to build, where there was none, and no need of one, except to keep my neighbors' cattle out of my corn field, they should have been compelled, not me, to put there, if they want it—I do not. I have no use for it, and never shall have. I had no use for an interior fence, which I found, cutting my eight acres into halves, and so I hauled it away, and buried it out of sight to help drain the soil. One more item, illustrative of division fences. Only a few weeks ago, one of my neighbors turned his cows into his own pasture, and they walked over the no fence of the half that his shiftless, do-nothing neighbor should maintain, and one of them gorged herself with refuse salt, and died. The value of that cow was more than the value of the pasturage of both lots for two years. Charge it as we should ten thousand similar losses, to that barbarous, wicked law, that says where two men own adjoining land, each shall build one-half the fence, and if he does not maintain it according to law, he shall have no right of action for damages from trespassing animals. That law I hope to live to see abrogated, and in its place these simple words: "Every man shall fence in his own stock; no man shall be obliged to fence his neighbor's stock out. It shall not be deemed a trespass to kill any hog running in the public highway, or that comes upon any one's premises. All trespassing animals may be shut up, or put to work, or used upon the premises trespassed upon, until the owner pays all damages and cost of keeping; and he shall have no action of recovery until all such damages are paid. If a person kills a trespassing animal, he shall only be liable to the owner for the value, after deducting damages and cost of keeping. All animals running at large in the highway shall be accounted trespassing animals." Such a "fence law" as that I am willing to live under. Can any honest man say that he is not?

Mr. Kingsbury.—I have lately been reading about the fence laws of the Goths—a people that we call barbarians—and I find that their practices were not half as much entitled to the appellation of barbarism as our own. I find it impossible to live in the country near this city, in any comfort, on account of cattle running at large.

John Harold.—We have some experience of cattle running at large. We have in Hempstead, L. I., 12,000 acres of common land; but, notwithstanding this large pasture, it does not keep the cattle out of our lanes, or from pushing into our gardens and lots. The system of fencing in our town has a direct tendency to make men dishonest. He illustrated the very great folly of allowing such a tract of land as the Hempstead plains to lay in the wasteful condition of a public pasture. The lands upon these plains that have been put under cultivation, prove to be of the very best character, and of easy cultivation, and naturally well drained.

Some twenty years ago I bought twenty acres of these lands—some that had been cultivated and worn out. I found a hard-pan three inches below the surface, which had been made by shallow plowing. I plowed this ten inches deep; my neighbors said I had utterly ruined my land, by plowing up the "yaller dirt." But the frost of one winter mellowed it down, and next year I manured and planted potatoes, and the next year sowed wheat, and in spite of the prophecy of my neighbors, I got a most excellent crop. I had, upon seven acres, 34 bushels per acre, which was so good that I sold it for seed at $2.50 a bushel. Then my neighbors said that I had got the wheat by manure, and a favorable season, but I never could, they said, raise grass. But I did. One of my neighbors fully satisfied himself why I got such a wheat crop—"it was because I sowed it exactly in the right time of the moon." The small portion of the plains that have been sold at auction were from $3 an acre to $40. It is not over twenty miles from the center of this city to the center of this tract of common land. Every effort has been made by a few of the citizens to have the town dispose of this Common, but hitherto without effect. Some of it has been squatted upon and held by possession for a long time, and the cultivation of such fields shows what might be made of the whole tract. It is to be hoped that a plan is now maturing that may meet the views of the landless voters of the town, so as to get authority to sell this tract, and get it under cultivation. The railroad fare is only fifty-five cents, or commutation $63 a year, from the city to what should be its great vegetable garden, instead of a barren waste and eye-sore to every stranger, who thinks, because he sees such a great tract uncultivated, that it is barren; but that is not the truth. It is because the majority of the people of the town prefer to keep it for a very poor cow pasture, rather than sell it, and have it made into a rich garden spot.

WINTER FEEDING OF CATTLE, AND THE BEST MANNER OF PREPARING FOOD FOR MAN AND BEAST.

This question was called up, and discussed to a small extent and continued. One gentleman said: The great argument against using concentrated animal food is that it is so much adulterated—we never know what we are buying.

R. G. Pardee.—Some experiments made in France have proved that a man can be sustained at hard labor, without waste, upon twelve mouthfuls of solid food a day. No man should eat heartily when in a state of excitement, or very much fatigued. I have proved that a very light meal under such circumstances is of much more advantage to me than a hearty meal.

HOW TO EAT WISELY.

Mr. Pardee read the following valuable extract from Hall's Journal of Health, upon the subject of taking our meals:

1. Never sit down to a table with an anxious or disturbed mind; better a hundredfold intermit that meal, for there will then be that much more food in the world for hungrier stomachs than yours; and, beside, eating under such circumstances can only, and will always prolong and aggravate the condition of things.

2. Never sit down to a meal after any intense mental effort, for physical and mental injury are inevitable, and no man has a right to deliberately injure body, mind, or estate.

3. Never go to a full table during bodily exhaustion—designated by some as being worn out, tired to death, used up, done over, and the like. The wisest thing you can do under such circumstances is to take a cracker and a cup of warm tea, either black or green, and no more. In ten minutes you will feel a degree of refreshment and liveliness which will be

pleasantly surprising to you; not of the transient kind which a glass of liquor affords, but permanent; for the tea gives present stimulus and a little strength, and before it subsides, nutriment begins to be drawn from the sugar and cream and bread, thus allowing the body gradually, and by safe degrees, to regain its usual vigor. Then, in a couple of hours, you may take a full meal, provided it does not bring it later than two hours before sundown; if later, then take nothing for that day in addition to the cracker and tea, and the next day you will feel a freshness and vigor not recently known.

No reader will require to be advised a second time who will make a trial as above, while it is a fact that no unusual observation, among intelligent physicians, that eating heartily and under bodily exhaustion is not unfrequently the cause of alarming and painful illness, and sometimes sudden death. These things being so, let every family make it a point to assemble around the family board with kindly feelings, with a cheerful humor, and a courteous spirit; and let that member be sent from it in disgrace who presumes to mar the ought-to-be blessed reunion by sullen silence, or impatient look, or angry tone, or complaining tongue. Eat in thankful gladness, or away with you to the kitchen, you graceless churl, you ungrateful pestilent lout that you are. There was grand and good philosophy in the old-time custom of having a buffoon or music at the dinner table.

Wm. Lawton earnestly advocated the use of tea, as a nutritious and invigorating substance, but he could not go for a reduction of the meat ration; nor would he give up now and then a glass of good old Madeira. He goes in for good living and plenty of it.

FALL FLOWERS.

On motion of Mr. Pardee, the discussion of and exhibition of fall flowers will be made a part of the question at the meeting next week.

Solon Robinson gave notice that he should call up the fence question upon every suitable occasion. He also wanted persons to come forward with some facts about the food of cattle,—something to demonstrate not only what is best, but how much is necessary, and what is the most economical.

Adjourned. H. MEIGS, *Secretary.*

Nov. 21, 1859.

Mr. William Lawton in the chair.

The first hour of the meeting, as usual, was devoted to miscellaneous business, during which the secretary read some extracts from foreign journals, &c.

CRANBERRIES.

The secretary stated that Jesse C. Young showed him a receipt for $156, the net result of one-third of an acre of the scrub-oak land of Long Island, cultivated in cranberries, and called up Mr. Young to make some remarks on the subject.

The cranberries for which the American Institute granted their premium, at their thirty-first annual Fair, were taken from vines set out in the months of June, July, and August, 1856, in my garden, in the village of Lakeland, Long Island; the land upon which they were grown is commonly known as plain lands; some affect to call these lands "barrens." My garden is situated about one-fourth of a mile north of the Long Island railroad, and about one mile south of a beautiful sheet of water, of nearly three miles in circuit, known as Ronkonkoma Lake. In 1855, the land upon which the berries were grown was covered with a dense growth of oak, pine, and scrub oak; in the spring of 1855, the land was "grubbed up," and potatoes planted, yielding a small crop. Becoming the owner of the land in 1856, I had it put in order, removing remaining stubs and raking, and as soon as possible had the vines put down, covering a space of 14,400 square feet, less than a third of an acre, from which I have gathered this year twenty-three bushels, and have yet probably a bushel remaining upon the vines.

My vines are set in drills thirty inches apart, and are placed in the drills at intervals of from ten to twelve inches. In the year 1856, '57, and the spring of '58, the plants were kept reasonably clean by hand weeding; sorrel and other foul stuff annoying, and hand weeding being considered unprofitable, recourse was had to other means of eradicating the pests; the push or scuffle-hoe was used in the fall of 1858, by which much time has been saved, and better results produced, the scuffle removing the weeds and at the same time opening the ground, giving a new impetus to the growth of the vines. Before the scuffle-hoe was used, the vines had nearly covered the ground between the drills, having already rooted in many places as they ran along; these were uprooted with the scuffle, and the runners cast upon the vines in the drills. When the vines were first planted out, they were about the size of broom straws; they are now of the size of a pipe-stem, and many of them even larger, and have spread in the drills to a compact mass of from ten to twelve inches in width; at what point their further spread should be arrested, further observation will determine; it may be the best policy to have an opening between the drills, to allow room for a frequent disturbance of the ground.

I have used no manure upon the ground, save ashing about fifteen feet square; I cannot discover that the ashes have either added to or diminished the productiveness of the vines, each part of the plot being about equally loaded with fruit.

The vines were taken from swamps and marshy lands within a mile or two of my place, and were generally selected from the outer edges of the localities where found, or from the dryest portions of the land where the plant was found growing wild.

My land is a sandy yellow loam, the sand quite coarse, giving to the land the appearance of having more sand in its composition than it really has.

We have to sink our wells fifty-seven feet to procure water, and have no running stream within a mile and a half of my house, so that my vines have to depend for aqueous nourishment upon the rains of heaven and the dews of Long Island, as I use no artificial means of irrigation.

One object which I had in view in coming upon the island was to cultivate the cranberry, my attention having been called to the subject in 1851; before my removal to the island, I had corresponded with Mr Bates, of Bellingham, Mass., upon the subject of the cranberry culture, giving Mr. Bates a description of the land, etc., and learning from him that the soil and its position were well adapted to the profitable growth of the berry.

Mr. Bates is a successful cultivator of the upland variety, known as "Bell Cranberry." Other engagements have interfered with, and prevented an extended cultivation of the fruit.

My son preceded me on the island, having commenced operations in the fall of 1853; in the spring of 1854 my son set out about fifteen feet square of the cranberry vine, upon land broken up the previous fall, he being the first, as far as I know, who commenced the cultivation of the cranberry on Long Island. The few vines then set out by my son, selected from the swamps, went into fruit the same season, and produced as deep colored and as sound berries as any which will be found in the samples left by me for exhibition; these vines are about four miles south of my house, on the same kind of land as those in my garden, with no better water advantages, and have each year borne fruit, and are now in a healthy and growing condition, although they have had no attention since the spring of 1855.

In the spring of 1855, Mr. E. F. Du Bois set out about an eighth of an acre, from the swamps, yielding, in 1856, half a bushel; in 1857, three bushels; in 1858, six bushels; and this year sixteen bushels. From other vines Mr. Du Bois gathered this year about four bushels. He has now, including the old and recent plantings, about two acres set out, all of which appear to be in good condition.

Mr. John H. Wiles, of Buffalo, having lands here, also, in 1855, commenced the cranberry cultivation, enlarging his plot in 1856. Mr. Wiles sent to market last year about four bushels; this year his crop falls but little short of eight barrels. Mr. W.'s vines are of the variety known as Upland, and were procured of Mr. Trowbridge, of New Haven, Conn.

In 1855 I broke up a piece of ground, and as soon as in condition for the reception of the vines, I had planted out about one-fourth of an acre, and shall gather from this piece between twenty and thirty bushels this season. This gathering is independent of my garden gathering of twenty-three bushels, the vines upon which, as before stated, were set out in 1856.

I have had many visitors to examine my cranberry crop, while growing, which has resulted in six of them having this fall commenced putting down vines, ranging in quantity of land employed, and to be employed, from a fourth of an acre by some of them, to twenty acres by others.

The cranberry is found growing wild in abundance in the meadows, on the south side of the island, and also, in most, if not all, of the swamps found in the center of the island, and can be obtained at a very moderate cost, should the owners charge anything for the privilege of gathering the vine from their lands; in a day a man can gather several thousand vines, and they will bear transplanting, in damp weather, throughout the year, when the ground is open, though I consider the spring and fall the best time for the operation. I have had them transplanted in blossom, and with the fruit set, without disturbing their growth, apparently, in the least; the vine is very tenacious of life.

Whether the "Upland" variety is better than the vines which bore the fruit which I place on exhibition, I know not, In all cases, as far as I can learn, you have to wait about three years from the time of transplanting before you commence getting much return; and as it takes about 16,000 plants to properly cover an acre, it becomes a question of importance to all, but of special and vital interest to the poor man, should he design to cultivate, to estimate the necessary outlay in plants; the "Upland" costs about ten dollars per thousand plants, one hundred and sixty dollars per acre; such as I use can be got, as before shown, at trifling cost. The Upland cannot always be got, even should one feel inclined to get them.

I think that my operations, and the operations of my neighbors, have demonstrated that—

The cranberry will grow and do well, though the vines be taken directly from the swamps;

That they will grow upon new land, and immediately upon its being broken up;

Without manure;

Without a wet subsoil;

Without artificial irrigation;

With but a moderate amount of labor;

Producing a good-sized, deep-colored, well-matured, and highly-flavored berry, and that in dollars and cents the returns are sufficient to induce many to follow the example set before them.

And here, permit me, in passing, to observe, that these lands are not only fitted for a profitable growth of the cranberry, but that from my own knowledge, that every production of the soil can be as well grown upon them as upon lands in the same parallel of latitude, with as little labor, and with the same outlay for manure, if properly handled and attended to.

CALIFORNIA VEGETATION.

The Secretary stated that the receipts of the late State fair in California were $35,000. Pears were exhibited that weighed 23 ounces, and peaches 17 ounces.

Mr. Bruce made some remarks upon the prevention of thieves from stealing growing fruit, which he gathered from California papers. A fruit-grower immerses fruit in a solution of ipecacuanha, where it is liable to be stolen. It works like a charm. Several persons in the vicinity have had to send for and pay the doctor, after stealing some of this prepared fruit. The apples, or pears, or grapes, thus prepared, are marked so as not to be partaken of by the family. As soon as it becomes known that the fruit is unhealthy, the owner is not troubled with fruit pilferers.

DELAWARE GRAPES.

Solon Robinson.—Mr. Chairman, while we are talking of fruit, I wish to call up the subject of grapes; because I see Dr. Grant, of Iowa, the greatest propagator of grapes in the world, and Andrew S. Fuller, of Brooklyn, whom we know as a horticulturist of both practical and scientific knowledge, and as it continues to be repeated that the Delaware and Red Traminer grapes are identical, I want one or both of these gentlemen to state a few facts touching the case.

Mr. Fuller replied as follows to this question: We are well aware that there has been much talk about the Delaware grape being the Red Traminer; but it was only by those who did not know either. How any person, even a casual observer, could confound the two, is more than we can understand, for the difference between them is so apparent that a man, by the sense of feeling, could easily tell one from the other. The buds of the Traminer, like all the foreign varieties, are very prominent—much larger than the Delaware, although the latter has buds quite large for a native. The large bud is a marked characteristic of the foreign varieties. The bark of the Delaware has the deep striated appearance of all our natives, with a hard, silicious covering, perhaps the hardest of all, not excepting the Concord, which it resembles in color. It is nearly destitute of bloom, which is always upon the wood of the Traminer. Toward the end of the shoots, the Delaware exhibits the peculiar hairiness which is another characteristic of the native vine. The Traminer has a soft wood, with large, light-colored spots upon it, especially when grown in the open air, and is quite tender in this latitude, killing to the ground unless protected, while the Delaware is as hardy as any of the wild fox-grapes. The Traminer has a thin ruffled leaf, difficult to press flat without its lobes overlapping or splitting. The Delaware is perfectly flat, thick, and leathery, like the Catawba, Diana, Concord, Anna, &c. All of these have thick leaves, and are not liable to sun-scald or mildew, while the Isabella, Rebecca, and some others, have thin leaves and are subject to this disease unless grown under very favorable circumstances. The mildew is not likely to attack a perfectly healthy native vine, and it generally attacks them at the time of cold, cloudy weather, when the leaves have become weak from the want of sun; therefore it will be seen that vines, to be healthy, must have a full exposure to the sun if you would keep them free from this malady. Weak growers are not likely to have well-ripened wood and leaves the first year from cuttings, unless assisted by artificial heat, consequently they have unripened roots. The Traminer does not ripen its wood in the open air, while the Delaware does, and perfectly. It is quite difficult to make the Delaware strike roots from cuttings; the Traminer strikes very readily. The mildew that attacks our native vines is quite different from that which attacks the foreign. The one that attacks the foreign commences on the upper surface and passes to the peduncle, and thence to the fruit, and is of a dark color. The one to which our native varieties are liable appears more gross, presenting the appearance of small transparent bladders, or minute pearls, that are disposed to attach themselves along the mid-rib of the leaf on the under side; consequently they often destroy it before a person is aware of what is the matter. This native mildew and sun-scald are mutually disposed toward each other; that is, if a plant is weakened by sun-scald, it is particularly predisposed to be attacked by mildew, and a plant upon which mildew fastens is obnoxious to sun-scald, as its life-blood is sucked out by this parasitic plant. The fruit of the Traminer does not resemble the Delaware as much as a Baldwin apple does a Spitzenberg, and one who can see a difference between these would not find it difficult to distinguish the grapes. If you will pick the Delaware before it is quite ripe, you will find that the skin parts readily from the flesh like the other natives; the Traminer adheres to the flesh the same as others of its class. If you allow young vines of the Delaware to mature all the fruit that sets, they will have quite a tough pulp, and have that peculiar foxiness which no foreign grape ever had.

Dr. Grant.—The history of the Delaware grape is, that it originated in the garden of Mr. Provost, in Frenchtown, N. J., and is supposed to be a seedling from the Catawba, hybridized, perhaps, with some foreign variety. It first became known at Delaware, Ohio, a few years ago, and now, wherever known, it is esteemed above all other varieties for its wonderful hardiness, as well as excellence of fruit. Mr. Longworth, who at first thought the Delaware and Traminer identical, has now given up all idea of that kind; and his head gardener stated to me, a short time since, that he considered the Delaware the best grape in this country for general cultivation.

The Chairman asked the Doctor to state whether farmers in general can easily prepare ground for grapes.

Dr. Grant replied, that any good corn land, deeply prepared, will grow grapes, but for a successful vineyard the land should be trenched three feet deep, and made rich, and there is nothing better than swamp muck for this purpose. It should be composted with animal manure, and well rotted, and thoroughly mixed with the soil.

R. G. Pardee.—The people of this country have undoubtedly been much imposed upon by this Red Traminer grape, sent to them as the genuine Delaware. Some nurserymen have also been imposed upon. Those who wish to plant a true Delaware vine must be careful where they obtain their stock. I have examined a good many bearing vines, and have never found one that did not give the highest satisfaction.

Dr. Grant stated that he had imported every variety of grape, and had found none that could withstand our winters, while the Delaware grows in every kind of exposure, and never suffers. As for the story about the Delaware growing wild in Pennsylvania, I have investigated that matter thoroughly, and defy any one to produce an iota of evidence to sustain the story.

A REMARKABLE BEET.

The Chairman exhibited a very remarkable beet, bearing a striking resemblance to a human being seated with his legs drawn up before him. He stated his opinion that the form was owing to a want of depth of tillage. There was strength enough in the top soil to produce a strong growth, but the sub-soil was so hard that it could not grow downward, and so it turned up. The production of a root crop is in a ratio proportioned to the depth the soil is made mellow. I have an anecdote about the Delaware grape. A friend of mine at the west gathered from a few vines that he had planted for his own use, $500 worth of grapes last season.

Dr. Grant.—Carrots are an excellent crop to grow upon ground prepared for grapes, and will pay all the expense of preparation.

A Westchester county cultivator, stated that he had grown carrots and parsnips over three feet long. I prefer parsnips to mellow soil, to carrots. Parsnip seed should never be kept over one year. The Belgian white carrot is the only sort I would recommend.

Mr. Fuller.—The Chrysanthemum is about the only flowering plant that stands hard freezing. There are a number of ornamental trees, the berries of which are very pretty, like some of those exhibited by Mr. Roberts. The *Euonymous*, known as the strawberry tree, produces a variety of colors, and grafts from each may be set in one stock so as to show a variety of colors and be very ornamental, where there is not room to grow a bush of each color. It is well worth cultivating, because it helps to make up a bouquet of autumn flowers.

FOOD FOR MEN AND DOMESTIC ANIMALS.

This one of the regular questions was called up and discussed at some length, and continued.

BUCKWHEAT BREAD.

F. K. Phoenix, of Bloomington, Ill., communicated the following receipt for making buckwheat bread: To one quart of buttermilk, add a tea-spoonful of soda, and flour enough to make a thin batter, and one egg, if convenient, and bake in a quick oven, and eat hot.

A lady said she would vouch for its excellence, but did not think the egg at all necessary.

Mr. Pardee.—This subject of cooking our food is the most important question we have ever discussed. It is not the quantity nor variety that we eat, but the manner of cooking it. Upon the subject of variety, I recommend our making a meal upon one dish only. If it is roast beef that you begin upon, eat no other meat, and but few other kinds of food at that meal. Make as great a variety as you please from day to day, but make each meal of a single dish as far as possible. Do not keep tasting and tasting of dish after dish. It is, no doubt, the cause of much of the ill-health of people of the present day.

John D. Ward.—Mr. Chairman: At the last meeting of the Club, while the preparation of food was under discussion, two or three of the members spoke of the difficulties they met with in getting potatoes properly boiled; and it appeared to be generally admitted that this operation, simple as it is commonly thought to be, is seldom well performed; in other words, that what Cobbett used contemptuously to call "Ireland's lazy root," is, as a general rule, spoiled in cooking. As this appeared to be the general opinion, and no remedy for the evil was proposed, it was thought, by the writer, that a description of the process adopted in a family of his acquaintance, where boiled potatoes are generally served at table in good condition, might perhaps be acceptable to some of those who find it difficult to get that part of their cooking operations well performed. The practice there is, first to select the number of potatoes required for the day, of nearly the same size, in order that they may all be done at the same time; large ones take more time in cooking than small ones, and if boiled together the smaller are apt to be over-done or the larger under-done, neither of which conditions is compatible with good cookery. When properly selected, they are peeled, washed and placed in a kettle with *cold* water enough to cover them, and a tablespoonful of salt to each dozen moderate sized potatoes, or in that proportion. They are then placed over a good fire, made to boil quickly and the boiling continued for 12 to 15 minutes—the longer time for the larger sizes. The water is then poured off, the same quantities of salt and fresh water poured on them, and the rapid boiling repeated and continued until a common fork will pass easily through them. When this stage of the process is reached, the water is immediately drained entirely off, and the kettle, with the cover removed, placed for four or five minutes in a situation where the temperature is nearly, but not quite high enough to scorch, or brown them. They are then taken up with a wooden spoon, to avoid breaking them, placed in a covered dish, previously warmed, and having a napkin laid in its bottom, which absorbs a large portion of the vapour, which they still give out.

If this process is rigidly followed, and the potatoes operated upon are of good quality when received by the cook, the most critical epicure will hardly be able to find a sufficient reason for condemning them when brought to the table. To insure complete success, however, the latter part of the boiling operation must be very carefully watched, and stopped at the right moment; if stopped too soon the process is incomplete, and only a part of each potato is eatable; if continued too long they fall to pieces and become watery and insipid; attention is therefore an important ingredient in properly preparing a dish of boiled potatoes.

If baked potatoes are desired, they may be prepared in a very satisfactory way, by first washing them quite clean, with the skins on, then peeling a strip half an inch wide once round, boiling them 15 minutes, in the manner before described, (using the same proportion of salt,) and afterwards baking them in a pan or oven, heated just sufficiently to brown the skins, towards the end of the operation, when most of the water they contained is driven off. These processes will not, of course, change the inherent qualities of the vegetables operated upon, or make naturally poor potatoes equal to good ones, treated in the same manner; but if carefully conducted, there will be little danger of spoiling those which are of good quality when placed in the hands of the cook, as frequently happens under ordinary management.

Solon Robinson.—I do not believe that we have ever had a question up for discussion by this club of more importance than this one of food for man and beast. My present remarks are upon food for man. It is not how much he shall eat, or how he shall eat, but how he shall cook it. That is the all-important question. We were told at the last meeting that greater variety of food, both for ourselves and domestic animals, was necessary. Is that so? I grant that it is agreeable to man, as well as the lower animals, to have a variety, and that we eat more, but is that a necessity? We accustom ourselves to the habit of eating of a great number of dishes, at the same meal, and vary them at different meals, and upon different days, and so consume an enormous quantity of food, and then—what then? Then we suffer and die with indigestion. And we treat our animals in pretty much the same way, and as a consequence we have a host of sick horses, and suffer enormous losses from diseased stock of all kinds. There are no more healthy people than those who live year in and year out upon one or two simple articles of food, prepared in the most simple manner. For instance, the rice-eaters of the East—the French and German farmer—and the negroes of our Southern States. Their weekly rations, when full fed, are three and one-quarter pounds of bacon, and a peck and a half of corn meal. The bacon is boiled, and the meal mixed with water only, to make a dough, and is baked in the most primative way, and eaten with the bacon and its fat, which is boiled out, so as to save all; and the meal is seldom sifted; and this, without change, is the food of a lifetime. And it is found sufficient and wholesome. In some districts meat is not given, and the negroes live month after month upon sweet potatoes—nothing but sweet potatoes—consuming about six pounds a day. So much as to the necessity of variety of food must suffice for this meal, though I might repeat examples of simple diet without end.

A word about cooking our food. There is where we suffer more than in the variety we consume. Simplicity in cooking is at an end. That went out when cooking-stoves came in. These iron monsters, that save fuel and consume human life, that have driven the old wood fire and great stone chimney and huge oven almost out of memory, except to a few old fogies like myself, who have the hardihood to declare that no man ever knew what a good roast was, whether of beef, mutton, veal, pork, goose, duck, or a glorious fat turkey, who has not eaten it that was cooked before a wood fire, suspended by a string, or supported by a spit resting on the ponderous fire-dogs. To be sweet, nutritious, and delightful to the palate, a roast must be cooked in the open air. The oxygen of the free atmosphere is just as necessary as fire to make a good roast.

It is a condition of things unattainable in all the family of cooking-stoves and ranges, unless one lately invented obviates, in some measure, as I believe it will, this great difficulty, which makes us so long after the good old times of two strings, spits, wood fires, and deliciously good, wholesome roast meat. Ah! how different from the empyreumatic masses of stuff called "roast meat," cooked in the almost air-tight oven of a stove. And it is just as impossible to make good bread in one of these cast-iron monsters as it is to roast meat. Both meat and bread, it is true, may be cooked so as to be eaten, and a person who does not know any better, will suppose it is as good as it is possible to make it. It is not so. No man or woman ever ate stove-cooked corn-bread that was so good as an old-fashioned johnny-cake, baked upon a board set up between the fire-dogs. And who that ever tasted them can forget the Yankee "short-cakes," or raised biscuit, baked in the old Dutch oven, where the lid was only half on, or was often taken off to see that the baking did not burn, letting in every time a full charge of oxygen to be absorbed by the baking dough. There was in those days no danger of dyspepsia from eating hot bread. Depend upon it, this whole subject of food and its preparation needs ventilation. It can not be too much thought of and talked of, in public or in the family circle, which, alas, no longer sits around the hearth-stone of the great stone fireplace. I will answer the question as to the stove alluded to, that I hope will obviate some of the difficulties of cooking that I have mentioned. It is called "Pearson's Respiratory Cooking Stove," and was patented a year ago only, and of course has not yet got into general use. The principle developed is the true one, and it should be at once applied to all stoves and ranges. A current of air is drawn in and heated by the fire and conveyed into the oven, thus supplying oxygen that in a close oven is consumed and soon exhausted. It appears to be one of the greatest improvements in the cooking apparatus of the age ever invented. From my own experience, I must say that it appears likely to obviate my greatest objections to food cooked in an ordinary stove-oven. It is certainly very difficult to produce that empyreumatical condition of meat in the oven of this respiring stove that always attends the cooking in an ordinary one. The same smell attends the cooking in this that we have from a joint hung up before an open fire-place. That is, it is pleasant, instead of being very disagreeable, and often sickening, as it always is from a common cooking-stove. The new principle developed in this stove is cooking in currents of fresh air, by which meat is really roasted, instead of being baked; and all who have tried it appear to be unanimous in its approval. The principle is what I wish people to think of, and not any particular form of stove. I want those who have never eaten food cooked in any other manner than in a close oven-stove, to reason upon the subject with an inquiring mind, whether there is not some better way. I want them to know that meat cooked in a currant of fresh air is not only more palatable, but more nutritious. For instance—this breathing-stove of Pearson's was tested about a month ago by a very respectable committee of the "Rhode Island Association for the Encouragement of Domestic Industry," and their report says that "a fire was kindled in a medium-sized stove, and in three and one-quarter hours they had upon the table ten pounds of mutton, nine pounds of roast beef, eight pounds of steak, eight pounds of sweet potatoes, six large pies, and a pan of biscuits; and that the meats were really roasted, and retained nearly all the natural juices, so that the taste was savory, delicious, rich, toothsome, just as they were in old times, when roasted before a wood fire." I repeat: it is not so much matter what we have to eat as it is how it is cooked. I am not here to give cookery lessons—we are giving those in *The Tribune* every week—but I urge the necessity of thinking more upon this all-important question.

I want somebody to think and act upon this principle, partially developed in Pearson's stove, whether working on a large scale can not be done in ovens supplied with hot air from a distant furnace, as our rooms are heated. If air can be heated hot enough to drive a "caloric engine," perhaps it can be heated hot enough to bake a loaf of bread. Who knows? Do those who cook meat ever try to know why one piece is not only more toothsome, but more nutritious than another? In the generally supposed simple act of boiling a piece of beef, there is great need of more thought. To-day it is rich, juicy, nutritious; to-morrow, "as dry as a chip," and containing but little more sustenance. Why? Both pieces were cut side by side, and both should have been equally good. And being cooked only one day apart, it is in vain to charge it to the influence of the moon. It is rather the influence of ignorance on the part of the cook. I doubt whether one in ten of them can tell the cause of the difference. I have never yet found a servant girl that could be convinced of the important necessity of never putting a piece of meat into the pot, unless the water was boiling and the fire in a condition to keep it boiling. The same principle is true of baking. Always put the meat, or bread, at first into a very hot oven, or before a very hot fire. That is one of the secrets of the johnny-cake—the dough was placed in such close proximity to the hot coals that it seared over and shut the sweetness in, and then had to be moved back a little to prevent burning. And the secret of the ventilated, or hot-air oven, is that a higher heat could be maintained, without danger of scorching. But enough of my lesson on cooking for one day. It is a question that will bear a great deal of talking about.

TREES FROM SEED.

Dr. Peck suggested the question for discussion at the next meeting of growing seedling trees, which was agreed to.

The Secretary said that great changes had taken place in trees—for instance, the chestnut trees of France of the present time are entirely different from the chestnuts of ancient times.

HENRY MEIGS, *Secretary.*

Nov. 28, 1859.

The Rev. Amos Brown (President of the People's College) in the chair.

During the hour devoted to miscellaneous business, a variety of matters were brought forward.

The Secretary read a translation from the *Journal of Horticulture*, Paris, about a disease now prevailing in almost all the nurseries of France and Belgium. This disease is even worse than the one now prevailing in this country in the old orchards. Also a paper upon the construction of bridges, upon the principle of an arch up stream, to resist the force of floods. He thought this an important matter to farmers, who generally construct the country-road bridges without much science. If built upon the plan proposed in this French paper, the ends firmly fixed in the banks, with the arch opposed to the current, the bridge is capable of resisting the force of a great flood. He thought it a very proper subject to bring up before a Farmers' Club, since more thought upon the manner of building bridges is certainly needed.

AGRICULTURAL SOCIETIES.

The Secretary gave a list of Agricultural Societies in the several States of the Union, amounting in the aggregate to seven hundred and eighty-six, nearly all in the northern States.

SEED POTATOES FOR BELGIUM.

An inquiry is made as to the best kind of potatoes to send to Belgium for seed.

Wm. S. Carpenter.—I would recommend the Prince Albert as the most exempt from rot of any of the many varieties that I have tried. The Davis Seedling is about the best potato I have grown. I have raised sixty varieties. The Peachblow is a good potato, and so is the Dykeman. The Buckeye, with me, is apt to grow hollow.

Solon Robinson.—I have found the Buckeye potato one of the best early potatoes, grown in a loamy soil, moderately rich.

ICE-HOUSES.

Wm. Lawton asked about ice-houses,—whether ice put in in very cold weather would keep the best.

Prof. Nash answered that the eastern icemen prefer to put in ice in very cold weather.

Wm. S. Carpenter, in answer to the question, said saw-dust is the best of all substances for packing ice in. Salt hay is next best, then rye straw. Ventilation is important. I exclude the air as much as possible opposite the ice, but in the top give free circulation.

Mr. Leonard, agent of the Institute.—I have lost my ice twice for want of ventilation, and then after fixing the two different ice-houses alike, my ice kept perfectly.

R. G. Pardee.—A great many of the failures of ice-houses are for want of drainage and ventilation. If stone is used in the bottom it should be covered with shavings, sawdust, or tan bark. If the ventilation and drainage are perfect, ice will keep almost anywhere—above or below ground.

John G. Bergen.—I am glad to hear something said about drainage of ice-houses, because it is with them as with land—all do not want draining. My ice-house has no drain, because the ground does not need it. Many ice-houses lately built in my neighborhood have a hole dug as deep as needed, and lined with rails set endwise, and the ice keeps well. The cost is a mere trifle.

Mr. Carpenter.—If an ice-house has a drain it must have a trap to exclude the air, or it will melt the ice.

The Secretary stated that non-conducting substances should be always used in connection with the ice. Pine boards are good non-conductors. Sawdust and charcoal are the best non-conductors.

Prof Nash.—A hollow wall is always preferable to a solid one for ice-houses, as well as for dwellings. I would recommend the construction of ice-houses on scientific principles. If the land is very porous, like Mr. Bergen's, it needs no artificial drainage. Air is undoubtedly the best non-conductor of any substance.

R. G. Pardee.—It is a known principle in keeping ice that you must have ventilation, and drainage must be provided for, so that no water will stand in the bottom.

Mr. Carpenter.—My practice is not to open my ice-house, except in the morning.

John G. Bergen.—This is an important question, and we should be careful not to befog it, with technicalities about ventilation. The degree of temperature when ice is packed has some effect, but it must be considered that there is a difference in the quality of the ice. I am in the habit of packing my ice with the thermometer at all degrees, from thawing to zero, and find no difference in its keeping if the ice is solid when it is put in.

Prof. Nash.—I built an ice-house in a shaded side-hill, ten feet square, at an expense of not exceeding $25, which kept ice perfectly. The cube of ice was about ten feet. But I think if I had built a better house I could have kept a smaller cube of ice, and it would have cost me much less to fill it.

A member stated that ice should be sound and newly frozen, to insure its keeping well. If made up of part snow, or partly thawed so as to be full of air-bubbles when packed, it will melt in the ice-house, no matter what the temperature is when it is packed. But solid, firm, hard-frozen ice may be put in the house in a warm day and kept perfect.

Solon Robinson.—I have found, as a general thing, that cheaply constructed ice-houses are the best ice-keepers. I know of one built in the side of a bank, where the soil is porous, of rough hemlock boards, the cracks in the sides open, and the door opened every day, and almost every hour, where the ice keeps better than in some very costly houses.

BOILING POTATOES.

The Secretary read the following rule for boiling potatoes: Always select potatoes of equal size, and peel and put them into cold water, with a spoonful of salt to a dozen tubers. The water is to be poured off before the potatoes are finished, and made dry by steam of the moisture being driven off.

SEEDLING TREES AND PLANTS.

This, one of the regular questions of the day, was called up, and Professor Terra Culture Comstock, introduced, who gave an exhibition of his dried roots, and explanations just far enough to invite people to come to his lectures and pay for any information they might obtain. As to answering any questions that would give the Club "his secret," that he utterly refused, but Mr. Pardee, in spite of the Professor's opposition, explained the whole subject, as he had, in one of the Professor's lectures, heard it several years ago. The whole secret is, not to plant seed or plants too deep. This explanation, the Professor utterly objected to, as "unfair," "betraying secrets," &c. Some gentlemen, who had urged the Club to hear the Terra Culture Professor, begged pardon for the act. They said they really supposed that he had something to say, but now they were convinced, after hearing all that he seemed able to tell, that he really had nothing valuable to communicate. Mr. Pardee put a number of questions to him, which he either could not or would not answer, and the Club came, apparently, to the conclusion that the Professor was an arrant humbug, and refused to allow him to occupy any more of their time. He afterwards attempted to "offer explanations," but the Club would not listen to him, and he probably left in disgust. At any rate, the members were disgusted with him.

Prof. Nash.—I have learned this week about terra-culture, that chestnuts will be most likely to grow if planted upon the top of the ground where it is very hard, if simply covered with leaves. If planted in mellow land they are not half as likely to grow as where the nuts fall upon a hard path in the woods.

Andrew S. Fuller.—Seedling forest trees can be profitably grown at a dollar a thousand, at one year old. Maples, I can grow for 25 cents a thousand. I have seen seedling maples three years old, two inches in diameter. If the planting of seeds of forest trees was practiced extensively, we might have in a few years an inexhaustible supply of wood and timber. The seed of silver maple ripens in June, and must be planted immediately, or they will not vegetate. The whole of the plains, or "barrens," as they are called, on Long Island, may be planted with maple or other forest-tree seed, and grow a most profitable crop. I have no difficulty in transplanting hickory trees, if the top roots are cut one or two years before I move the trees. There is no difficulty in transplanting large trees if care is taken. No top-rooted tree can be moved safely without previously cutting the top roots.

There is no doubt that thousands of acres of the cheap lands of Long Island could be planted to forest trees, and the crop would be more profitable than any other. This city needs hundreds of miles of street trees at this time. Where can they be obtained? All the nurseries about the city could not furnish a tithe of what is needed. I have examined the plain lands of Long Island, and find them abundantly rich for producing forest trees, if the scrub oaks, &c., were cleared away, and land plowed and planted four feet apart, and cultivated two or three years. As the trees grow, they may be thinned out, either for fuel or timber, or for transplanting. Theree is no doubt in my mind that large fortunes might be made upon the outlay of small capital, in making forest-tree plantations near this city. Now is about the right time to plant black walnuts, butternuts and acorns.

VARIETIES OF CORN.

Wm. S. Carpenter exhibited some specimens of Imperial White corn, which grows in long ears and small cobs, and is very productive. It originated in Connecticut. The golden drop is another excellent new sort of corn, and so is the "hominy corn," from Chesapeake Bay. Mr. Carpenter said that he grew this year twenty-five varieties of corn. The King Philip yielded him seventy bushels per acre. He also wished it to be distinctly understood that he has no seed for sale. He recommends those who want improved varieties of corn, to apply to Thorburn instead of him, as he is not a seedsman, but a sort of amateur farmer, anxious to develop the best sorts of cultivated plants.

The next meeting will be at noon, Monday, Dec. 5, and the subject of ice-houses, seedling trees, and the cultivation of food for men and animals, will be up for further discussion.

H. MEIGS, *Secretary.*

December 5, 1859.

Present, 97 members. Robert L. Pell in the chair.

A NEW DISINFECTOR.

R. G. Pardee stated that 100 parts of plaster of Paris, and one to three parts of coal tar, mixed together, is the ingredients of a new disinfectant lately discovered and highly approved in Paris. It must be thoroughly mixed by grinding, or in a mortar, and then a very small portion has a wonderful effect upon every substance of an offensive nature. This is the new disinfector that the papers of France have lately spoken of as in use in the hospitals of Paris. It is a new discovery, and if only half as useful as it is alleged, it must become very popular, as it is so very inexpensive. It is sold out of the Paris shops by the single pound, and less than ten cents.

THE HUBBARD SQUASH.

Wm. S. Carpenter exhibited a specimen of the pure Hubbard squash, which, of twenty-five varieties grown by him, he considers the best, in all respects, of the whole squash family. The shell of this is of a pale green, and the flesh a rich golden yellow. The largest size is about twelve or fifteen pounds weight, and average about seven or eight pounds. One of the good qualities of this squash is that it keeps very long into winter. It is also, like the Boston marrow, good to use even before it is fully ripe. Mr. Carpenter opened the one presented, and distributed the seed to all the members of the Club who desired to plant them.

ICE HOUSES.

This question was called up and discussed at length. Some of the facts elicited are given as follows:

Mr. Pardee read an extract from a paper upon the ventilation and drainage of ice-houses. It states that an underground ice-house is calculated to melt ice much faster than above, because the earth gets heated and melts the ice.

Wm. S. Carpenter.—It is a question of great moment to farmers how small a cube of ice can be kept well. I have not, in my experience, found that less than ten feet square will keep.

Mr. Pell said that he built an ice-house just like a log cabin, in the ground, with a board roof, that keeps ice first rate. He built one of stone, and one of brick, laid in cement, neither of which would keep ice. He fills in a cold day, and leaves the house open to allow the ice to freeze. He packs broken ice into all the spaces between the cakes, and puts straw at the bottom eight inches thick, and packs the ice up to the wood on the sides, and leaves it until June or July—when there is a space melted away all around, and that is then packed tight with straw. His ice-house is most thoroughly ventilated in the upper portion of it. A full set of ice-tools costs about $50, but he did not think it necessary for a farmer to go to that expense; a saw is nearly as good as an ice-plow, to cut ice on a small scale, when great haste is not very necessary, as is the case with the great ice-gatherers for market.

John G. Bergen.—My ice-house is a cellar, about twelve feet square at the top and ten feet at the bottom, and this is fitted with a double-boarded frame, the hollow filled with sawdust. The earth is so porous that it gives a natural drainage. There is a building, used for other purposes, over the ice-house, which is ventilated, but the ice part has no ventilation; and I cover the ice with sawdust, and also around the sides, and it keeps well. I pack the cakes close, and they come out as square as they went in.

Wm. S. Carpenter.—I have a floor over my ice, which I keep covered with straw, and find it an excellent thing to prevent thawing.

Prof. Nash.—I think that an ice-house should not have any provision for ventilation—the tighter the better.

Mr. Bergen is of the same opinion about ventilation. He thinks the air should be excluded as far as possible.

Mr. Pell.—There is a free circulation of air in the upper part of my ice-house, and nothing but straw to exclude the air from the ice.

Mr. Bergen.—Some of my neighbors break up the blocks of ice, but I prefer the solid blocks. My opinion is that straw is better than salt hay to pack ice in. I should prefer to have a very heavy coat of straw on the ice, and then I don't care about the ventilation above. I will say, however, that my neighbors, in houses that have no upper floor, and are a good deal open at the top, do keep the ice well.

Solon Robinson.—There is a misunderstanding about this term ventilation. As one of the advocates of it for an ice-house, as well as all other houses, I do not mean open exposure, but simply to allow an escape of the heated air that will accumulate in the space between the straw and the roof. Make it as tight all around the body of the ice as possible, by using non-conducting substances from the exterior, and cover the top of the ice as closely as you please with saw dust or straw, but don't make the upper part too close. At least, leave the cracks in the gable ends open. As for the sides, the best of all substances to fill with is fine charcoal; the next best, sawdust; next, tan bark, straw, leaves from the forest, or salt hay, or any other fibrous substance. It is not necessary to have a double wall if your ice is sufficiently packed around with any of the above substances. The air, at any rate, must not come in contact with the ice, nor with a board that touches it. And a stone on the ground will melt ice much quicker than wood. What I have been most anxious for in bringing up this discussion upon ice-houses, is to divert the subject of all scientific nonsense about making buildings to keep ice of so expensive a character that no common farmer would undertake it. Yet there are thousands of men who might enjoy the comforts of a full supply of ice, and some of them would do it if they only knew that they could build a house at almost no cost. A log cabin, as described by Mr. Pell, or a cellar lined with fence rails, and a board roof, with plenty of saw-dust, leaves, or straw, will keep it longer than a stone or brick building, put up at a cost of $500. I want to encourage people to build cheap ice-houses.

Prof. Nash.—We are too much inclined to be innovators in all our buildings, and in ice-houses particularly. We must look at the true philosophy of keeping ice, or we shall fail; for the philosophy of it is to put it as much away from the air as possible, and that is why we pack it in straw or saw-dust, &c. As to giving some ventilation to the loft, or space over the ice, it may be of service.

Wm. S. Carpenter.—Some of my neighbors think the ice keeps the best if the cakes are set on edge.

Mr. Bergen.—The great ice-packers I have seen put in their cakes flat, and very compact.

Mr. Pell.—The great Hudson River ice-houses are very large, and always built above ground, with double walls, filled with saw-dust. The ice is packed close, and broken ice filled into all the cracks. Some single ice-houses hold 3,000 tons; and most of the ice used in the city is cut upon the river, and not upon lakes.

Mr. Quinn.—I noticed that some of these ice-houses use salt hay. The roofs and sides are double, and the best of them are filled with fine charcoal, making the walls eighteen inches thick. I know one person who had an under-ground ice-house, and now has one above, which he prefers—the ice keeps in this the best.

Mr. Carpenter.—I find the bottom layer of my house, which is an under-ground one, keeps better than the layers above.

Mr. Pell.—Fine charcoal absorbs 90 per cent of air, and that is the reason why it is such a good non-conductor; and it is the very best substance to pack plants in for transportation.

Mr. Quinn.—I have frequently packed plants in charcoal dust, and preserved them better than in any other substance. There is no doubt about its being the best of all substances to fill in the walls of an ice-house, because it holds air and does not decay.

TREE PLANTING.

This question was again called up.

SEEDLING FOREST TREES.

Mr. R. L. Pell.—The bursting of the flower is the first and most important step taken by any plant towards producing the seed which is to perpetuate its species. This is the precise period when new chemical changes commence. The juice of the sugar beet, sugar cane, and maple tree, cease to be sweet the moment the flowers become mature. The seeds of the grape, the apple, plum, and lemon, are covered with the pulp of the fruit, which at one stage is tasteless, the next sour, the third sweet, and when fully ripe the annual functions of the tree are discharged. And we may now collect the seeds from the most beautiful individuals of the species we desire to cultivate. They should be sown at once, or preserved in some locality where they will be necessitated to undergo few changes in regard to heat and moisture. Nature sows her seeds immediately on maturity, but many of them do not grow until the ensuing spring, particularly the seeds of pines and firs. Poplar and willow seeds cannot be kept advantageously, as they spring up in the fall, a few weeks after dropping from the tree. The seed of the holly and hawthorn lie two years in the ground before they come up, unless they are macerated in water and sown as soon as gathered. The seeds of the fir and pine tribe ripen from October to January. The stone pine, cypress, and cedar of Lebanon, should be first sown in pots. The walnut, chestnut, beech, and acorns, ripen from October to December, and may be sown at once, in a sandy loam soil, in drills, and they will sprout in May. Pits with kernels in them, ripen from September to November, and should be collected in the latter month, laid in heaps, covered with sand, to rot away the pulp, and sown in the spring. Berries having stones, ripen from August to November; they may be buried in heaps, and with an occasional turning, left so for two years; when planted in the spring of the third year, they start up at once and make a rapid growth. The wild cherry pit, if sown in July, when the fruit is ripe, will grow the following spring, but if kept until August, will not come up in less than two years.

Capsules having small seeds, such as the elder, pinet, spindle tree, and some others, should have their seed completely separated before they are sown, under an excessively thin covering of soil, which should be rolled, and shaded by matting, or limbs of trees, until the plants show themselves above ground. Leguminous seeds, growing in pods, ripen from September to October; they may be dried in their pods, kept until spring, and be sown in rows in beds.

Feathery and cottony seeds ripen from May to November; the poplars in May, willows and elms in June, alders in November, and may be sown immediately after they are gathered, and they will come up before fall. The proper way to plant them is to pulverize a piece of ground completely, then roll it slightly, sow the seed, and cover them with vegetable mould just sufficient to conceal them from the eye. After this, water the beds, and shade them effectually.

In raising timber or other forest trees, nearly everything depends upon properly adapting them to the particular nature of the land; its being in a suitable state of preparation for their reception, and the planting being performed at a proper season, at proper distances apart, and in a perfect manner, according to the situation and nature of the trees.

There are a few other circumstances that demand particular attention in conducting this business in an effectual manner, such as keeping the trees free from all sorts of rubbish, and perfectly clean, besides protecting them from the shade and annoyance of other plants, during the first years of their growth, and at the same time sheltering and securing them from the intrusion of horned cattle, sheep and horses. It is only by paying attention in these several respects that plantations of any kind of trees can be reared with any degree of success or certainty.

The particular varieties of soils best adapted to the cultivation of the different sorts of timber trees, and in which some or other of them will be found to grow in the best manner, are gravels and light sands, with porous sub-soils; gravelly or sandy loams on porous sub-soils; loamy, gravelly or sandy soils, on retentive sub-soils; gravelly loams, on porous sub-soils; loamy clays or clayey loams, on porous sub-soils; and strong, clayey or loamy soils, on retentive sub-soils. Likewise, thin soils on gravelly sub-soils; also on clay or retentive sub-soils.

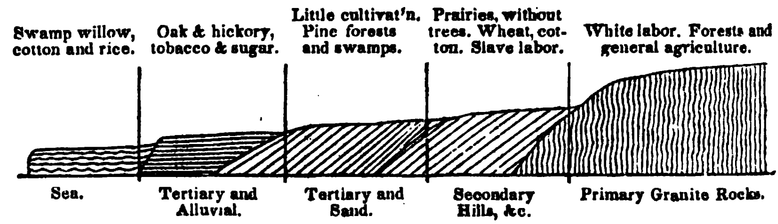
Soils that are of a ferruginous kind, and possessing little depth, are the most unfavorable to the growth of timber, particularly when the sub-soil is retentive, as the destructive moisture, in such cases, stagnates near the surface, and completely deprives the roots of those important healthy materials which they should take up for the purpose of support and nourishment.

In forming plantations, besides the absolute necessity of having them secured by fences, if the soils are not dry, recourse must be had to draining, to take off the superfluous water. The soil and situation being thus considered and prepared, a proper selection of plants should be made. Such as particularly deserve attention for waste lands, are oak, ash, locust, beech, elm, larch, maple, birch, wild cherry, black walnut, and the various kinds of fir. The oak has been found to do well and thrive on soils of very opposite qualities, but those of a deep, dry, firm nature, are best adapted to it, provided they are sheltered. The ash succeeds in nearly all dry soils, even if the situations are much exposed. The elm prefers a damp, mellow soil; the beech, elevated gravelly soils, with a loamy subsoil. And in all soils and situations, the larch will thrive and do well, where the fir cannot be raised at all. The latter is proverbially known to succeed the best in the most elevated and poorest places.

In the following table will be found a view of the nature of the soil in which different varieties of timber-trees are found to succeed in the most certain manner, with the uses to which they may be converted, commercially speaking:

TABLE.

Surface soil.	Subsoil.	Common growth.	Planted growth.	Use of.
Heavy and gravelly loams,	Heavy loam,	Birch, hornbeam, ash, hazel, beech,	Oak ash, chestnut, willow, linden, walnut,	Timber, hop poles, cord-wood.
Sandy loams,	Heavy loam,	do do	Elm, beech, pine, spruce,	do do
Flinty strong loam,	Heavy loam	do do	Willow and chestnuts,	Timber, fencing poles, &c.
Gravelly and sandy loams,	Gravelly loam,	Ash, beech, oak, hazel,	Chestnut and ash,	do do
Sandy and flinty loams,	Heavy flinty loam,	Ash, beech, hornbeam, and oak,	Ash, beech, larch,	Timber, fencing, hop poles, cord wood, charcoal.
Poor gravelly loams,	Deep flinty loam,	Beech and oak,	Beech and larch,	Cord-wood and hoop poles.
Flinty soils,	Gravelly loam,	Oak, hazel, beech, and ash,	Chestnut, ash, and willow,	Fencing, stakes, cord-wood.
Light black loam,	Dry sandy gravel,	Beech, elm, and ash,	Ash and elm,	Various uses in husbandry.
Flinty gravelly loam,	Strong loam,	Oak, ash, and beech,	Ash,	do do
Gravelly loam,	Heavy clay,	Ash, hazel, and oak,	Ash and oak,	Cordwood, wheelwright's, &c.
Sandy gravel,	Gravel and loam,	Pine, &c.,	Larch and chestnut,	Poles, stakes, &c.
Gravelly loam,	Gravelly loam, with stones	Oak,	Chestnut,	Cord-wood, fencing, &c.
Sandy loam,	Gravelly loam,	Birch, oak, and hornbeam,	Chestnut,	do do
Sandy loam and stone,	Gravelly loam & sandstone	Oak, beech, birch, hazel, ash,	Chestnut,	do do
Wet, springy land,	Moist and boggy,	Alder and willows,	Osier,	Baskets, hurdles, &c.
Light sandy loam,	Dry and gravelly,	Mountain ash,	Pine, fir, &c.,	Timber, poles, etc.



The above figure represents the coast of America, from the ocean to the mountains, and shows the relations between plants and soils. The same plants do not succeed on clays, sands and marls equally; and even where they do succeed for a time, they die out without apparent cause, notwithstanding the soil is as sandy, clay as dure, and the alluvial as rich in lime as ever. It is because there are other substances requisite, which in time are worn out, such as potash, magnesia, iron, &c., and so soon as this is the case plants die.

In planting, where it is performed on the more elevated or mountainous tracts, warmth and shelter are to be considered, as without these the trees seldom thrive in a perfect manner. In such situations there is, in general, the most difficulty and the least progress made in the raising of timber trees; the success of the planter depending greatly upon choosing such sorts as may in future become the most highly valuable, on planting thickly with plants of not too large a size, and on a considerable plat or extent of ground both in length and width being planted.

In these unfriendly situations to the growth of trees, small plants must be chosen and planted thick on the ground, as the winds are very prejudicial to trees of a large stature, by loosening the roots and frequently breaking the fibers; but, though this is the most disadvantageous situation for planting, it is possible, with proper care in the above respects, to grow young timber on it. Where it is intended to cover a mountain from its base, it will be most conveniently done by planting round the base in the first instance, rising gradually, by which means an artificial shelter will be forming, from the growth that will be made by the trees that were first planted, particularly if the extent is such as to require several years to complete the planting. The portion first planted should be extensive in all cases where shelter is intended.

The kinds of trees to be selected for such situations should be regulated by the quality of the soil. The pine would generally flourish the best, but the larch is to be preferred as a nurse. The ash, mountain ash, beech, birch and fir may all be planted with hopes of success; and where the soil is deepest and richest, the oak. In sheltered positions, where the inconvenience of exposure to the winds is obviated, trees may be planted with great hopes of success, the principal care necessary in this case being to select those of a right kind, and placing them at the proper distances, according to their varieties and sizes. As these situations admit of most kinds, on the more sheltered parts, the beech, elm, larch, oak, walnut, spruce, chesnut, linden, hickory, bass wood, white wood, locust and fir may be suitable; and on the less sheltered portions, the birch, ash, sycamore, hornbeam, mountain ash and tamarack.

The river banks are favorable for the growth of most varieties of timber, the poplar, willow, ozier, elm and hickory, according as they are more or less dry.

Situations contiguous to the sea-coast, or what are usually called maritime situations, are generally inimical to the successful growth of timber; but where such are planted, the sycamore and beech will bear the sea-breeze better than most others, and make good nurses for other varieties that may be attempted. In these situations, if the banks are high, the best mode is to plant the face of it with poplars and elms, as they grow rapidly, and thus afford a screen for the trees within. Stout, well-rooted plants should be employed, of about eighteen inches growth, and placed thirty inches apart.

There are two modes pursued by planters in providing the trees. One is by raising the plants in a nursery from the seed; the other, by purchasing the trees from a public nursery, in a proper state, to be planted out. The former is by far the best plan, where the business of planting is to be conducted on a large scale, as it is often difficult to procure the quantity or variety that may be wanted at the proper season. Besides, all plants succeed far better when they are planted as fast as they are removed from the nursery. But for small concerns it is more advantageous to obtain them from a nursery, as they can never be raised on a small scale so economically as they may be provided in this way.

When nurseries are attempted, the land should be good, as it is next to impossible to raise luxuriant plants on poor soils. Dry soils, that are not particularly light, will raise healthy trees of most varieties. A loam of middling texture, inclining to sand, neither poor nor rich, twenty-four inches deep, lying on a porous substratum, makes good nursery ground. It is best that the soil should not approach the extremes of excessive or meagre sterility, since all plants don't thrive alike in the same soil, and an opportunity would thereby be afforded of placing each in that most congenial to its nature. The site should not be too low nor too high, exposed nor sheltered, that it may answer all purposes. No situation can be more eligible for a nursery than ground that has been occupied for a kitchen garden. The mellowness and pulverization afforded by a previous growth of culinary vegetables bring land into the most suitable state for the raising of young trees, besides it is at the same time cleared effectually of vermin, such as grubs, insects, &c. If I were selecting a location for a nursery, it would be a valley, surrounded on all sides except the south by hills. The ground should be drained, subsoiled, ploughed, manured, and limed at the rate of two hundred bushels to the acre of oyster shell, then cropped with turnips, which being eaten off by sheep in the fall, will reduce the land to fine condition for all sorts of tree seeds. As soon as the acorns, walnuts, and other forest tree seeds fall, I would prepare a large quantity, and sow them in the manner following: Draw drills by a line, in the same manner as is practiced for peas, with a hoe, and sow the seeds therein so thick that they nearly touch each other, and leave the space of twelve inches between row and row, and between every fifth row a space of two feet for the alleys. While the seeds are in the ground, great care must be taken to keep them free from vermin and weeds. When the rows meet they require thinning; this is accomplished by taking away one row on each side of the middle one, which leaves the three rows the same distance apart as the breadth of the alleys. In removing these rows care must be taken not to injure the roots of the plants removed nor those left on each side. The rest of the young plants may now be left in rows two feet apart until the tops meet, then take up every other row, and leave the rest in the rows four feet apart, until they reach the height of 5½ feet, which is as large a size as is desirable to be planted. In taking up trees of this size, dig a trench at each end of each row, two feet deep, then undermine the trees, and let them fall into the trench with entire roots. The future success of all trees depends upon their being well taken up. After plants have been in the seed beds for one year, they should be removed to the nursery, and planted in rows fourteen inches apart, and four feet in the rows, where they may remain two years, and then be planted out.

The next thing that requires attention is to drain the ground and prepare it for the reception of the plants. This requires great care, as much depends upon its being in a proper condition for this purpose. It is performed by the spade, or plough, according to circumstances—I would infinitely prefer the spade. All course plants on the land should be burned, and their ashes blended with the soil, as they greatly promote the growth of plants. All steep situations, abounding in rocks and stones, will necessarily have to be overcome with the spade, as the holes for the trees must be made to the full depth of the soil, and for roots occupying, when spread out, nine inches, make holes eighteen inches in diameter; and see that the ground taken from the hole is well reduced and completely pulverized before planting. To effect this object, it may be necessary to make them several days before the trees are put in. After they are taken up, before planting, cut off with a sharp knife the bruised extremities, if there are any, and mix the trees as to variety in proper proportions, and distribute them at the holes dug for their reception, in order that they may be ready for the planters to set them before the spongioles of the roots get dry. The operation of planting may be most expeditiously performed by three persons,—a man to do the work, a man to hold the tree, and a boy to spread the roots for shape. In performing this important business, the laborer stirs and levels the mould in the holes, and thus fits it for the reception of the plant. The man then places the plant in the hole, and the boy adjusts the fibers of its roots, about one inch deeper than they were in the nursery, and the laborer fills in the loose mould while the tree is kept in constant motion to mix the particles of soil intimately among the roots. The laborer then proceeds to prepare the next hole, while the man and boy close the mould around the tree and complete the operation. If the site on which you plant is bleak, and soil comparatively barren, I would place the trees forty-eight inches apart; if deep and loamy, forty inches will be found a good distance. In planting trees of a larger growth than specified, it will be absolutely necessary to secure them well by staking against the wind, as, if they become loose, the fibers will be so much lacerated and broken that they will inevitably die.

During the past fall I set out five hundred maples and elms, two inches in diameter, along my road fences, and for fear stakes might injure them by rubbing, I rammed the earth closely about the roots, and piled stones on top of the ground around each tree, which practice in my soil will succeed. As the principal property of any young tree, intended for transplantation, consists in a large quantity of healthy spongioles, it becomes necessary, in order to obtain this desirable result, that the young tree should be nursed, in a proper soil, for a couple of years, to attain this object, as it enables us to commit them to a far less congenial soil with greater probability of ultimate success. If we commit a plant to the plantation that has both branch and root to make, it stands to reason that it has a much less chance of succeeding than that which has only the branch to form during the first season after so important a change. This demonstrates the reason why young plants of small size surpass those in growth that are larger, as we are more successful in taking them up with entire roots, filled with tufty unbroken fibres, ready to seek pasturage in their new habitation for the sustenance of the trunk. Whenever it becomes necessary, after taking up a tree, to top the roots, no efforts of human art can repair the injury.

For belts, or clumps, one hundred feet in diameter, in a bleak position, and thin soil, I would plant the margins not more than two feet six inches apart, and the interior three feet six inches. If the situation is sheltered, and soil tolerably deep, four, or even five feet might answer, according to circumstances. Small clumps, or narrow belts should, as a general thing, be planted thicker than a more extended mass, that the plants may shelter each other. For a deep soil, and thoroughly sheltered position, six feet will be a proper medium distance. The plants will then have a chance to grow, until their necessary thinnings may be made useful for bean poles, hop poles, &c. And even if left to form timber, they will draw each other up, instead of becoming squat, if thus near each other, and will never require the pruning saw. Thick rather than thin planting is by far the safest side to err on. I noticed the Duke of Portland's plantations, where trees of various sizes were originally planted, at the rate of 2,000 trees to the acre, which appeared to be about right. His custom was to plant acorns with the dibble, after the trees were set.

In planting timber trees it is necessary to pay attention to the most advantageous manner of intermixing trees. Sometimes they are planted abroad in groups, but I think they succeed best when planted as nature plants, indiscriminately, and they may then be more easily and effectually protected. If you determine to plant six varieties, I would recommend two maples for one birch; two elms for one beech; two oaks for one elm; two beeches for one ash; and two ashes for one birch. Your plantation will then be formed of kinds likely to succeed each other, if either disagrees with the climate or soil.

It is of immense importance in raising timber plantations, particularly in bleak situations, as before stated, that protection and warmth be afforded by the use of trees of quick growth and spreading branches. For this purpose the larch is without doubt the best nurse, because it grows well and rapidly in all situations, and on all soils that are not naturally moist. The cedar, pine, and hemlock, are also admirable.

In some situations the beech is eminently useful, because it is patient of the sea breeze. In some situations a nurse will be found necessary for each timber tree; in more sheltered places, one for three or four may be found a sufficient allowance.

The proper time for planting, with the greatest chance of success, differs according to the nature of the soil and plants, as well as the weather. In dry, porous soils, with hardy trees, from the middle of October to the first of December, is probably the most suitable time; at least, I have found it so; they then become established against the heat of summer, which destroys multitudes of new planted trees. In moist soils, of a clayey nature, from the end of February to the tenth of April, when the soil is not too wet to adhere to the spade, or sun, and will divide well and intermingle with the fibrous roots of the tree. If your soil is retentive, never plant in the time of rain, nor, in fact, in less than a day or two after, nor after a fall of snow, until its effects have entirely disappeared. On the other hand, if the soil is absorbent and dry, you may plant during the fall of gentle rains, and directly after heavy ones, or the disappearance of snow. You may regulate your planting by the difference in forwardness of the trees you intend to set out; for example, the willow, alder, poplar, mountain ash, birch, linden, horse-chestnut, sycamore, larch, and elm, should certainly be planted in our section by the first week of March; and the hornbeam, maple, chestnut, common ash, oak, hickory, wild cherry, pines, hemlocks, cedars, by the first week of April, at the latest, unless the season is unusually backward. After the trees have been planted, it is necessary that the plantation should not be lost sight of; it must be kept clean and entirely free from weeds, for at least four years; this may be done by cultivating crops in it, and the constant use of the plow and horse hoe.

There is another point that requires attention, which is, filling up the vacancies that may be caused by dead trees; this operation might be left until the fourth year; if it is done too early, many plants will be removed that would have thrown out shoots from the bottom.

The thinning of underwood must be regulated by the luxuriance of their growth and the purposes to which the cuttings are to be applied; when for large uses, more thinning will be necessary than in the contrary case.

If it be profitable to plant new woods, it is assuredly much more so to protect those that are already planted; to fill them up where thin, and to restore them when in a state of decline. The expense, in this way, is not only lessened by the saving of new fences, but the profit is much increased by the rapid growth of the wood, when planted in situations that are sheltered by other trees and plants already growing. In woods where saplings rise in great numbers, spontaneously, their growth should, by all means, be encouraged, and the pernicious custom of permitting cattle to feed in the woods, under an idea that after they are of a certain age, say seven years old, the shoots are grown out of the way and cannot be injured, abandoned, for the reason that there is always a great deal of the underwood so low as never to get out of the reach of cattle, but constantly liable to be kept down and cropt by them, and the decay of the stocks consequently much hastened.

Another cause of the early decay of woods, is the want of draining; another still, the custom of suffering woods to grow too old before cutting, whereby the strong shoots smother the weak ones, and by their dropping kill the stocks on which they grow. A fourth cause of decay is the practice of cutting the old wood as close to the stock as possible, which is highly prejudicial to the succeeding shoots, as well as the custom of not clearing the woods early in the summer, so as to prevent the new shoots from being injured by the cattle, wagons, and other circumstances. When a wood lot is cut off, and the sprouts begin to grow, my practice is to leave two stems upon each stool, for a double growth, by which a portion of wood may be procured each fall. I have a large plantation of chestnuts, now seven years old, treated in this way, the trees are as straight as arrows, and perfectly luxuriant. The period of cutting wood should be regulated by the luxuriance of its growth, the demand of the country, and the uses to which it is to be applied when cut. The interest of money and loss of the succeeding growth, tell greatly against the value of standing wood after it is fit to cut. As soon, therefore, as wood is fit for market, it should be cut, unless it will pay compound interest by standing longer, or in other words, will pay not only the simple interest of the first value, but likewise the loss of so many years growth of the wood, as so far advanced towards another crop. Wood for fuel may be cut very young. Hazel is generally fit for dead hedges, grape-poles, &c., from nine to ten years old; ash, for hop poles and sheep cribs, at the same age; other woods for fences, from eleven to fourteen years old; ash, birch, beech, hickory, alder, willows, for turners' uses, rafters, &c., from sixteen to twenty years old. Wood-cutting generally commences in November, and may be carried on through the winter months till March, but should be completed before April, except where the wood is to be barked, in which case the beginning of May is the proper time, as it will then peel the best. The older wood is, the later it should be cut in the spring. If cut early, and a hard winter ensues, the damage done to the stocks will be very great. Young, flourishing wood may be cut at any proper season, but will be far more durable, when cut in the most stagnant state of the sap; and in all cases when it is required for bending, it cannot be cut too early in the winter; if cut when the sap is rising, it will be brittle, and totally unfit for those purposes. Farmers should be cautious how they listen to the advice of their wood-choppers, when timber plantations are to be cut, as they will invariably suggest that method and season which will be most pleasing to themselves.

There is another species of planting, which in numerous situations, such as those of the boggy borders of streams, is exceedingly advantageous; this is that of the ozier, for the purpose of basket-making. The method of planting is thus: obtain sets sixteen inches long, cut off diagonally from the strongest shoots of the last year's growth, care being taken not to cut too near the top, as that part is porous; then mark the ground out in rows, two feet apart, in the month of March, and place the sets in them, twenty inches from each other, leaving six inches of the sets above ground; they must then be kept perfectly free from weeds by the hoe, but if the ground is too wet for this instrument, a weeding hook must be used, as this is absolutely necessary to insure a good plantation; and it is likewise necessary to keep the land well drained, that the tides may be prevented from remaining long, for upon this depend the firmness and quality of the rods.

The first year the willows should be cut over with a bill-hook, close to the stock, and bound up in hurdles, measuring thirty-five inches round at fifteen inches above the butt ends. The next year a portion may be left standing, to supply large stuff for the ribs of large baskets. The planting of oziers is expensive the first year; but if properly managed, and kept clean, they produce an increasing profit annually. The three varieties generally planted are:

1st. The salix vitallina, cultivated for nurserymen.

2d. The salix amygdalina, of which there are several varieties, used for binding garden produce.

3d. The salix vinimalis, of which there are several varieties; they are chiefly used by basket makers. These three descriptions comprehend the most useful kinds, and are the most profitable, in point of crop, of any that are cultivated.

But the thermal conditions of even such a region may interfere with its fertility, and prevent the growth of the willow. All soils must possess a certain physical texture before any plant will grow upon them; the temperature of the locality determines, in a measure, what plant shall succeed, as upon the combined influences of moisture and heat depend the cultivated crops and varied floras of different parts of the world. Hundreds of plants, which produce magnificently beneath a tropical sun, will not expand a single flower when exposed to the influences of an arctic sky.

Man also exercises a wonderful influence upon soil, which is worthy of attentive consideration. When he first lands in our western country, he finds fertility everywhere surrounding him. The green and luxuriant grass waves high and thick, and the splendid trees raise their glorious, broad and wide-spreading branches loftily towards the heavens. He sets himself diligently to work and reclaims a few acres, which at first yield him ample returns for his labors. He continues, year after year, to plow, harrow, sow and reap, and, as his soil yields him abundant crops, he considers its bosom perfectly exhaustless. But in due course of time, creeping slowly and gradually, a change appears, completely dimming the smiling landscape. The grain is at first less lovely, then less luxuriant, then sparse in quantity, and finally dies beneath the scourge of a parasitic fungus.

What should he do now—gather the droppings of his stock, and the fermented juices of his cattle-yards, and strew the thin sowings of gypsum and lime upon his fields? Yes; but what does he do? Why, of course, he forsakes his long-cultivated domain, and hews himself another home from the native forest, and the same abundance is followed by the same disasters. His neighbors partake of the same folly, and they all advance like a devouring army against the green and beautiful woods, which are tramped under their advancing cultivation. The axe levels with the earth its annual prey, and multitude after multitude proceed thus. Forests rise on the horizon before them, and naked deserts are left behind, for a new race of cultivators to cover again with green herbage, by zealous, skillful and assiduous labors.

The Club then adjourned.

H. MEIGS, *Secretary.*

December 19, 1859.

Present, 55 members. Robert L. Pell, late President of the American Institute, in the chair.

The Secretary read translations and extracts made by him from the works received from abroad and home, since the last meeting, viz:

HORTICULTURAL SOCIETY OF ST. PETERSBURG, RUSSIA.

We have just received, free of charge, from the Russian government, the Statutes (by laws) of the Society. The objects of the Society are set orth. Best native and foreign plants in the most suitable locations, climates, &c., of the empire. The interchange of all good things in the world of horticulture, with like societies of all nations. The officers, President J. Jeleynod, Vice-President E. Regel, Secretary Germofft, write the following letter to the American Institute:

ST. PETERSBURG, *Nov.* 6, 1859.

To the American Institute, New York:

No. 126. The undersigned have the honor to bring to the knowledge of the American Institute that a society has been formed for the development of every branch of horticulture in Russia. It is organized in St. Petersburg, under the high protection of his Imperial Highness the Grand Duke Nicholas, sanctioned by his Majesty the Emperor.

The undersigned hope that the American Institute will not refuse to enter into amicable relations with the young society, and contribute to its prosperity by exchanges, which shall be mutual in all useful experience.

The statutes admit members home and abroad of both sexes. Residents of the city may be present as visitors only once (it being proper that they should become paying members). Annual payment by members, ten roubles, (about six dollars) in advance, or one hundred roubles for life-membership. The failure in annual payment, after a second notice to pay, for one year, loses membership.

The members elect their officers. The society meets once a month,—oftener if desired. An annual meeting hears a summary of the year's transactions. The secretary prepares all the papers for publication.

Alterations in these statutes (by-laws) may be proposed at monthly meetings by the president, in writing, when desired by ten members, and enacted by a vote of three-fourths of the members present.

(Southern Homestead, Nashville, Tennessee. Nov. 19th, 1859.)

SURFACE MANURING.—BY JUDGE FRENCH.

Some of the farmers of England still spread manure on the surface for months before ploughing in. The Mark Lane Express, of London, boldly asserts that Mr. Hudson, from long experience, says: "Farm yard dung is improved by an exposure of months on the surface of the ground, and that the crops are better from dung exposed than on lands in which it has been covered in the usual moist half-rotted condition. That this is a fact, although it clashes with chemistry. That Prof. Samuel W. Johnson, of Yale College, and others, it seems, are "convinced that manures hauled out and spread broadcast upon the soil during the fall and winter do not suffer any material loss of ammonia, because that requires heat and fermentation to carry it off, and in fall and winter there is not heat enough to produce fermentation; that "blow, rain, snow and freeze don't lose the ammonia." Prof. Mapes is opposed to this, and he is not only a man of science, but one of the most successful farmers in getting a profit from his land within my knowledge, and so we cannot help having more faith in science illustrated by practice, than in practical results by men who pretend to no scientific knowledge. The man of science is always a more accurate and reliable observer than the merely practical man.

THE SECKEL PEAR.

We wish to preserve the history of this distinguished seedling, which, as an example of what may come from planting seeds of fruit trees, and so does the famons seedling, the Duchesse d'Angoulême and some others.

The original Seckel pear tree was found on the farm of Lawrence Seckel, at "The Neck," late Passayunk township, a few miles southerly of Philadelphia. The farm was bought by Stephen Girard, and is now in the hands of his trustees, the City Corporation. Seckel was a wine merchant, on the corner of Market street and Fourth street. The tree stood a little distance from the eastern front of Seckel's farm-house. It was large, vigorous, and bore abundantly. Gen. Gurney from it inoculated numerous pear trees on his place, Cherry Grove, on Shippen's lane. From these the General gave numerous slips, and named it *Seckel*. The noble Duchesse d'Angoulême pear was found in a hedge, wild. Some of these pears have been so extraordinary in size, that one has been sold in New York for *five dollars!*

So much for seedling fruit trees.

As to Seedling Oaks: Perhaps we may recover that extraordinary race, now extinct, which existed many centuries ago, near Paris, from which the rafters and other timbers of the oldest existing buildings in Paris were made—growing very tall and almost of uniform diameter for at least forty feet, and so durable that rafters put up of it 600 years ago are perfectly sound yet. And perhaps we may gain in other forest trees singular advantages. Of one advantage we are sure. According to our worthy co-laborer in useful and beautiful botany, Mr. Andrew S. Fuller, we are sure of millions of trees at a trifling expense. Emmanuel, of Sardinia, may establish a better policy in Italy, but can do little for which fame will never forget him, than he has done by clothing his native hills with valuable trees, of which they had been stripped a thousand years. He has put on them five millions of forest trees.

California reports an enormous apple grown there this season, being fifteen inches in circumference, and weighing two pounds ten ounces! We have one, a model made by Townsend Glover, in our model fruit cabinet. It is the Glovia Mundi. It measures the same circumference, fifteen inches, and weighs but twenty-three ounces, while the California of same measurement weighs forty-two ounces. There is an error of a pound avoirdupois too much.

PHORMIUM TENAT.

The colonial government of New Zealand offer a reward of £4,000 sterling ($20,000) for a method of preparing this fiber for exportation as fit for making cloths, &c.

England cautions the world against buying the very cheap steam engines made there for exportation, as very dangerous.

L. B. Olmstead, of Binghamton, says to us: I used a solution of tar and water to coat my seed corn, and then rolled them in plaster. They refused to come up; the coat was too hard for them.

COMPOSTING MUCK IN WINTER.

A. W. Harlow, of Windsor, Vt., asks our opinions "as to the best manner of composting mock with stable manures. The larger share of these is made in cold weather, and often thrown into an open yard, and hence is frozen. When should the muck be dug—how preserved—how and when applied to the manure? Should it be mixed with the manure daily, as it comes from the stables?" Important questions these, and, as he says, doubtless are interesting to a great many persons beside him. I answer that the best way is to so arrange his farming that he can get one year ahead with his manure, and then compost it in the summer; because in such a cold climate, he cannot work to advantage except he has a manure cellar, with his muck stored up, when the work of composting can go on in freezing weather.

It is no matter when muck is dug; though I think it will decompose faster if piled in warm weather.

Andrew S. Fuller recommonded that the writer should purchase Davies' Muck Manuel; that will give him an abundance of information upon the subject of muck.

FLOWERS.

Solon Robinson.—Upon the principle of the old saying, in peace prepare for war, I should like to read a letter upon flowers. Let us in winter prepare for spring: so let us talk at every meeting during these months of what we should talk a good deal of then.

My correspondent thinks the cultivation of flowers ennobles the heart of man—makes him a better being. And so do I.

Mr. Robinson then read a long letter, full of practical quotations, from L. Norris, of Windsor, Ashtabula Co., Ohio, encouraging to all who own a foot of land, to plant flowers. He is aware, that all will not, for many men look upon the cultivation of flowers as beneath their dignity—as a sort of contemptible business; and that the love of flowers in a man evinces a sort of lack-a-daisical character.

Love of flowers, Mr. Norris thinks, may be cultivated, and that it should be with the plants, in all home education. The mother should show and impress her children with the beauty of flowers, and how their own beauty will blossom while they are engaged in their culture. Teach them to think what a fruitless world this would be without flowers.

The reason that flowers take such a deep hold upon the human mind, is because they are the emblems of love.

Though all individual flowers are transient, yet the family, is almost ever blooming, even in our climate. And flowers in winter are instructive sermons, written in the snow.

In spring, what lessons of love are taught by birds and flowers. Let every household prepare now for their cultivation, as soon as drear Winter has passed away.

Mr. Norris then gives the following list of flowers that he cultivated last season, which he recommends as one of easy culture, and giving a great variety of brilliant colors:

Truffant's finest Pæomia Flowered Asters (ten distict colors).—These are not the old single "Chiny Oysters," but the flowers, of which we have specimens over three inches in diameter, and very double, of all colors, from white to a dark red, and are mottled, edged and striped in infinite variety.

Balsams.—These, too, are not the old single "Lady Slippers," but are double; many colors.

Prussian Scabions, or Mourning Bride.—Eight large flowered varieties, in bloom all the season; very beautiful for summer bouquets.

Calliopsis.—A fine display of brilliant colors; ten varieties.

Convolvulus Minor.—Six varieties of this beautiful gem.

California Poppy.—Very splendid; blossoms all the season.

Morning Glory.—(Ipomea).—From Prussia; striped and varied colors of the most vivid hues.

Galardia Pieta.—Very fine; in blossom all the season.

We have also the *Foxgloves*, with their tall spikes of nodding bells, displaying their leopard-like spotting, in which the bee

—— "makes her sweet music."

Zinnia Elegans.—Very splendid; mixed.

French and Indian Marygold.—Magnificent and effective; a splendid display.

Globe Amaranths.—Very brilliant; purple, white and variegated.

Petunias, Portulaca, Mexican Ageratum (Alba), &c.

Solon Robinson.—I have a word to say on this winter feed for stock. It is more by way of query, and for feeders to think of, than by way of instruction. My experience in feeding domestic animals is not sufficient to warrant me in giving instruction. I have served my time in too rough a school for that. I have fed a good deal of hay, worth from $1.50 to $5 a tun; and corn from ten to twenty-five cents a bushel, and other grain in proportion, and straw absolutely valueless. While living in such a district, I have often been asked the question why I did not raise more roots for my cattle? I answered: Simply because it would not pay. I did buy a lot of rutabagas one autumn, delivered at my house at six cents a bushel, and the use of them taught me that they were dear food. I would now, if living in such a district, feed roots to stock just so far as I thought necessary to keep the animals in good health, and no more; not if I could buy at the same price, which was one-fourth the price of sound corn; and I question the economy of feeding any kind of roots at the same rate of value, to any greater extent than is required for health. That roots, particularly white turnips, are too largely fed in cold weather, to young cattle, I have no doubt. They are so full of water, that too much of it is taken into the same stomach with the food. If roots, or any other watery food, is too largely fed to milch cows before and after calving, you will be sure to have a mean calf. If we will think, and take reason for a guide, as to what man requires for healthy food, we shall not go far wrong with domestic animals. Man loves roots occasionally, and so he does soup, or other sloppy food; but what would he be good for if fed week after week upon such watery stuff as turnips, or such porridge as some people compel their cattle to eat? After all, this question of winter feeding is a question of values; and it is not alone the value, counted by first cost, but the value of results. Now what is the use of giving my opinion that this or that kind of food is the best, or most economical, when I cannot say of a single thing, I *know*. I don't know, and don't know anybody who does. It is all guess work, and at the present price of cattle-food, it is expensive guessing.

AN AX TO GRIND.

The number of axes that are brought here to grind is remarkable. To-day, a Mr. Pitkin of East New York, had a very dull one to be sharpened, something about making shoes. The Club listened to a long, dull, pointless harangue, until tired, and then requested him to carry his grist to some other mill.

ICE-HOUSES.

Solon Robinson.—The discussion of this question has awakened a good deal of interest in the country. I hold in my hand a letter from C. Robbins, of this city, who lives upon Staten Island, and wants to build an ice-house, and avoid some of the errors of his neighbors. As his letter imparts as well as asks information, I will read it. He says:

"I live on Staten Island, where neither charcoal, sawdust nor tanbark can be had, except at great expense; but dry forest leaves and salt hay cost but a trifle. Will either of the latter answer a good purpose for an ice-house out of ground, and if so, which is the best? (1.)

"I propose to make two boxes of rough hemlock boards—the outer one 12 feet square by 10 feet high, the inner one 10 feet square by the same hight—so as to leave a continuous space of 12 inches all round between the boxes; this space to be filled with leaves or hay pressed down tight. (2.) The roof to be covered with tongued and grooved boards, and set at an angle of 35 deg., with a projection of two feet. The double doors will be in the peak of the roof. The outside frame to be supported by chestnut posts, lined on one side, and set into the ground four feet apart; the inside box, or frame, to be supported by joists, 2x4 inches, set edgeways, three feet apart, secured against the inner side. Chestnut sleepers will be laid on the ground, covered with loose boards, from which there will be good drainage. Will it be necessary to make the roof double, and have an opening on the top for ventilation? (3.) Can you suggest any impovement on this plan, without increasing the cost? (4.) One of my neighbors, for the want of tanbark or sawdust, built an expensive ice-house on the ground, walled up with stone, but it fails to keep the ice. (5.)

Yours truly, C. ROBBINS, No. 13, Cliff st.

I will briefly answer these inquiries: 1. Either salt hay or leaves will answer a good purpose, and I should use whichever is the cheapest.

2. This plan will make an ice-house that will keep the contents safe in any place.

3. There is the same necessity for a double roof, that there is for double sides, and more, for that is not necessary if there is a good thick lining of straw betwen the ice and boards. I double my roof by a thatch of straw, first laid and then boarded over.

4. The improvement I should suggest would be a cheaper frame. Make the outside just like the inside. It is cheaper, and will answer just as well as the chestnut posts.

5. This is probably owing to deficient ventilation. That is, openings in the gable ends far above the ice, to allow the hot air and foul gases that accumulate there to pass off. If the stone walls of an ice-house once get heated from the sun, they retain the heat day and night, and communicate it to the atmosphere within. Stone is the worst material for an ice-house that can be used.

A very interesting discussion followed upon the ice-house question, and the preservation of fruit by ice.

Mr. J. P. Veeder.—I made my ice-house by digging a hole ten or twelve feet square, and lined it with boards as a double wall, filled in with tan-bark. My roof is a straw thatch. My ice keeps perfectly well. I have good drainage, and I put about six inches of straw around the ice, on bottom, sides, and top. The house is only four feet below the surface, and the rest above. I pack about twelve or fourteen tons of ice, being careful to fill all the crevices with broken ice.

John G. Bergen said that he did not think a double roof necessary. None of the ice-houses in his neighborhood had them.

Prof. Mapes.—The point settled in building ice-houses is that the whole ice-house should be above ground. This is the practice in Massachusetts. There is no substance equal to a confined space of air for the walls of ice-houses. Build of whatever substance you please, so that you have a double wall, and tight enough to hold air, and you will have a perfect protector of ice. As to ventilation, Jenner, who first constructed ventilated ice-boxes, found that ice melted faster in ventilated than in unventilated boxes. Ventilation is necessary when you desire to keep food sweet. If there is no ventilation, the confined air soon becomes very foul from animal substances on ice. He then gave some interesting particulars of the large refrigerators in some of the city packing-houses. Some are so large that they use up a number of tons of ice a day. The temperature is kept at 42°, and in large rooms thus cooled, hundreds of animals can be killed and cooled every day. If your object is to keep ice without use, shut up close, it needs no ventilation. He also spoke of Curtis's plan of keeping fruit, which he keeps secret. But it is true that it keeps fruit very perfectly. I thought that I had found out how to keep fruit, by imbedding it in bone black. The fruit keeps well, but it is worthless, as the aroma of the fruit is lost. The best thing that I have tried is very clean washed and dried beach sand. The stem of the fruit, if it has one, must be sealed. I wrap each pear in tissue paper, and then, if the sand is pure and dry, and placed where it will keep dry, the fruit keeps well.

Wm. S. Carpenter.—I have prolonged the ripening of pears by placing them on the ice. Fall pippins are preserved in the same way, packed in barrels, and simply laid upon the ice.

The Chairman mentioned an experiment of packing apples in cider, but it did not answer. I packed pippins in dry sand, and kept them three years. The apples were first dipped in wax, and then wrapped in tissue paper, and carefully packed in well washed and dried sand.

Mr. Carpenter offered a number of specimens of his fruit, to be tasted by the Club, which were found to have kept perfectly; Bartlett pears almost as good as when in season.

The Chairman said that he had tested the fruit preserved in Boston by Mr. Curtis, and found that fall pears were fresh and good in spring. He suggested that the preservation was owing to carbonic acid gas.

Prof. Mapes thought ice would deteriorate pears, but not apples.

Mr. Carpenter said that so far as he had noticed, the pears did not suffer in any of their natural good qualities, from being kept many weeks beyond their season upon the ice.

Dr. Percy suggested that sand must be very pure to pack fruit in. If it contains any portion of clay, it will injure the fruit.

Mr. Fuller said that what was wanted was pure silex, in a powdered state. Columella mentions the plan, of keeping grapes in his day, packed in pure sand.

Prof. Mapes mentioned that grapes packed in dry bran, in large unglazed earthen jars, had often been imported and sold in this city, in very good condition. No fine pear can be ripened upon the tree. It must be artificially ripened, and if it can be carried forward beyond its proper time, in the ice-house, it shows another of the uses of such a building upon a farm.

PORTUGAL ONIONS.

Mr. Carpenter exhibited a specimen of the almost scentless Portugal onion, that weighed two pounds. It is shaped something like a pear, and stands six inches high.

APPLE-PIE MELON.

Mr. Carpenter also exhibited and distributed the seeds of an apple-pie melon, which he said answered as a tolerable substitute for apples.

FALL PIPPIN APPLES.

Also exhibited by the same gentleman, that are kept in barrels in his own house, were pronounced as perfect as though just in season.

The next meeting will be at noon on Monday, Jan. 10, 1860.

H. MEIGS, *Secretary*.

January 9, 1860.

Present, 51 members. Richard G. Pardee in the chair.

The Secretary, Meigs, read the following translations and extracts, from the works received by the Institute since the last meeting, from abroad and home, viz:

THE RAILWAY SMOKE NUISANCE.

The British Parliament was obliged to pass laws, prohibiting the locomotives from making smoke, on account of its injurious effects all along the roads. This led to invention, and recently, a man by the name of Clark, has invented a method, which has lately been fully proved successful on the Great Northern Railway, on which for several months it has been found by repeated trials, to stop all smoke. There are small tubes about one sixteenth of an inch in diameter in the top of the fire box, through which air and steam are forced by the apparatus on to the top of the fire, and destroys all smoke, and saves cost of fuel.

We mention this to farmers as a matter of interest to them here, as well as in England; and as a matter interesting to all people near steam engines in towns and cities—who suffer from the suffocating blackening smoke from their chimnies, all of which by the new process, can be consumed as well as in the locomotives.

The buildings of the cities of steam engines, have become blackened; everything is affected by the *smoke nuisance.*

THE NEW ZEALAND FLAX.—*Phormium tenax.*

The colonial government offer premiums for rendering this staple useful. £4000 sterling ($20,000), for a method of making it available for export as a fibre for merchandize. Let one of our American inventors do it.

SULPHATE OF IRON, COMMONLY CALLED COPPERAS.

Mons. Dubreuil, of France, a horticulturist, says that he watered melons and fruit trees with a *weak solution* of it, and obtained much larger fruit. Using it when the fruit first set, in June, and every fortnight, always in the evening. For the first three waterings, he dissolves twenty-six grains of copperas to one quart of water. For the last two waterings, thirty-five grains to a quart of water. His Easter Beurrés grew very large.

The bottoms of flower pots should always have broken potheads and rubbly charcoal two inches deep, and the little pebbles or stones should not be sifted out of the earth. Drainage is so important in and out of pots. And so is air. The earth-worms render important service by making their numerous air galleries. We found benefit to the plants by running *stout needles* deep into the earth near plants.

Some put a flower into a larger one and stuff the space between them *with moss for better winter keep.*

DELAWARE GRAPE.

Samuel Miller, of Calmdale Penn., an excellent vineyardist, declares the Delaware grape to be "the head and front of all American grapes, as to quality, bunch and productiveness; hardy; no mildew; no rot; Concord grape also." I would stop but very little, in offering a premium of one hundred dollars for one as good.

ORANGE TREE OF THE AZORES.

A tree has produced in a season, 20,000 merchantable oranges.

AN INSECT THAT DESTROYS CATERPILLARS.

The *Diadema* of Fabricius—the *Raptoria* of Say—*Sinea multispinosa,* of De Goer—may be kept in our trees as a destroyer of caterpillars.

CURCULIO.

Hang rags, dipped in *gas tar*, on the limbs of the trees. Curculio hates the smell. Dip them again when the smell is diminished, and your plums will be good.

WEEDS.

Prof. Buckman, in his prize essay for the Royal Agricultural Society of England, says:

"We have found in a bushel of red clover seed, 1,920,000 seeds of the heavy narrowled plantain."

In a bushel of Saint Foin seed, 23,040 seeds of false barnet poterium sangiusorta. This weed grows so much faster than the saint foin, that it sometimes smothers it.

Sinapis arvensis—mustard—whose seed is like turnip, has covered whole fields of turnips and others with a *blase of yellow.* This weed is eaten by cattle, and many a fine bullock has been killed by its powerful stimulating effects. *The microscope is excellent to try your seeds.* Black mustard invades flax.

The aggregate amount of the fertility of soil, destroyed by weeds, is enormous.

H. Meigs.—We should never buy, and never sell weed seeds. See that all is pure before you put it into the bosom of your soil.

CULTURE OF GRAIN.—BY VICTOR CHATTEL (DEVIRE).

CAMPANDRE-VALCONGREUN (Arrondissement de Caen, *October* 16, 1859.)

It sometimes happens in the course of many years of bad crops, that good seed of the cereals can be procured, and then at a high price. Then we see many farmers use the poor seed for economy sake, and always lay the fault on weather, frost or something else besides poor seed. From comparative trials, which I have made, of thirty varieties of wheat, I find that the wheat of the year, shaken out of the ears or which remains in the ears until the time of sowing, will yield the same results as the wheat of the year of equal quality.

My observation teaches me that smut and rust attack the grain on the shortest stalks in the field. Too late sowing is apt to cause less perfect growth.

[Journal of the Royal Agricultural Society of England. Volume 19.]

HORSE POWER CONSIDERED.

The average cost of keeping a horse, a year, in England, is about $100 a year—some do it for $80. M. Melvin uses twenty horses to cultivate 675 acres—part ploughed from eight to eleven inches deep, the rest seven or eight inches deep. The twenty horses consume food, worth about $3,300. The crops, wheat, forty-four bushels an acre, the barley, fifty bushels.

All the expense of horse power, men, annual depreciation &c., &c., sum up about $5,500 a year, for the 675 acre farm, or about $40 per acre. The crop of wheat at forty bushels per acre, worth about $2 a bushel, shows a profit of $40 an acre, or on the whole 675 acres, at the same rate, some $27,000 a year.

The Royal Agricultural Society has given us, engraved, the results of interesting microscopic researches in technology and animal tissue, and components. A power of 400 diameters has been usually employed on wheat leaf, wood, mammary, gland, &c. The milk secreting follicles and lactiferous or secretory ducts represent a tree with its branches loaded with fruit. The milk shows roundish bodies, about $\frac{1}{4000}$ of an inch diameter and some $\frac{1}{2000}$ floating fluid of great specific gravity, so that these milk globules rise and form the cream. These constitute the oil of milk.

There are also floating in the fluid *egg-shaped* globules, gramular, pale yellow, numerous—some $\frac{1}{800}$ of an inch diameter. These give a purgative action to the milk.

The cut section of grains of wheat, under the same power of 400 are given, and they *command* our admiration, as also do the leaves and wood of vegetables. The Royal Society uses its scientific power nobly in these most interesting investigations. The natural figure of the starch cells of wheat is always *egg-shaped*. So are the cells of Indian corn when first formed, but when fully grown are close-packed and have many fitting sides.

DAVOL'S MOWING MACHINE.

Report of Mr. B. Leonard.

In compliance with request of the Farmers' Club, I herewith give my views of a model mowing machine, exhibited by J. Davol, Esq.

The machine being mounted on wheels, similar and about the size of a common cart, can be hauled with less force over the ground than is required to drag the mowing machines mounted on small cast iron trucks, as is common in the ordinary mowing machines.

The large bevel wheel, nearly as large in diameter as the main wheel of the carriage, giving motion to the cutting blade, through one pinion and link, possesses advantages over those machines which multiply motion through several wheels and shafts.

The levers are so arranged as to give the conductor complete control over the machine, and especially the cutting bar, which is easily raised over obstructions and thrown entirely over the carriage at will.

The frame work to which the cutting bar is suspended, is strong and well arranged. The side pressure upon the horses, must be light, and as a whole, I think the plow a good one, and will meet the expectation of the inventor as to its working properties.

Respectfully submitted,

W. B. LEONARD, *Committee.*

AMERICAN INSTITUTE, *Jan.* 4, 1860.

CHINESE SORGHUM IN FRANCE.

We have cultivated it now to a considerable amount for its sugar. An Austrian by the name of Winter, has discovered a method of obtaining quite large quantities of the carmin coloring matter, which is naturally small on the stalk—by means of piling up the stalks (after they have been pressed for their juice) in heaps several feet high, when fermentation immediately sets in, he airs the heap so as to prevent putridity, and in two weeks, the whole mass becomes reddish brown; he then stops the fermentation by drying it. He then grinds it fine—puts it into vessels in cold water for twelve hours, but little of the color dissolves. He then drains it, adds weak solution of caustic soda or potash, until all color is extracted. He then neutralizes the solution with sulphuric acid, which precipitates the coloring matter into red flakes; these he washes in water, collects it on filters and dries it. This color dissolves in alcohol, in alkaline, leys, dilute acid, &c. The colors produced by it, are said to be unchanged by light or by washing in warm soap suds.

RECORDING BAROMETER AND THERMOMETER.

Dr. Van Der Weyde exhibited and explained the new recording barometer and thermometer in one instrument, of Mr. Becker, of Brooklyn.

This machine is wound up as a clock, runs twenty-four hours, and by means of long delicate levers, with delicate pencils, records all the movements of both metres for the twenty-four hours, on prepared tables of paper. Mr. Becker has also anemometers and pluviometers, which register the winds in direction and in force of pressure on paper tables, prepared with figures, &c. The pounds on a square foot, and the inches of rain. These recording instruments are considered very useful and new.

HOT BEDS.

Solon Robinson read a letter asking some questions about raising tomato plants in hot beds.

John G. Bergen, of Long Island.—The hot beds are usually prepared in February, with not less than eighteen inches of horse manure. The frames outside are protected by horse manure, and the glass is covered with mats. This protects the plants against frost. When the plants are three inches high, they are picked out into other beds or pots, where less manure is used. There they grow until it is time to set them in the field.

Wm. S. Carpenter.—I make my hot bed about April 1st, and that I find early enough where I grow them, in Westchester county.

Mr. Quinn, farmer of Prof. Mapes, Newark, N. J.—We make our beds in February, and sow the seed four days after we make the bed, and we use cold manure with the hot manure. We transplant three or four times, and always give the plants air every mild day, to harden them and to prevent them from growing spindling.

Mr. Carpenter.—For a private family, I think the first of April full time to make the hot bed, and then the plants will not need to be transplanted into other beds. A good size for the sash is three by six feet.

Mr. Bergen.—The first of April may be early enough for farmers and private families, but not for some of the Long Island gardeners, who grow ten acres of tomatoes in one field, and they must have the plants set out as soon as the weather will permit.

MUMMY PEAS.

Wm. S. Carpenter.—I have some peas said to have come from an Egyptian tomb, presented by Prof. Morse, who has proved their germinating power.

Andrew S. Fuller thinks there is an immense deal of humbug about these mummy peas, mummy wheat, &c. He thinks that evidence is needed to prove the germinating power of any seed three thousand years old.

Dr. Samuel R. Percy.—I once took some seeds of grain, called club wheat, from the mummy clothes in Abbot's Museum, and planted them, and they vegetated and grew freely. There is no doubt in my mind that these seeds were as old as the mummy, for I took them out of the enveloping wax.

FOREST TREES, AND THEIR CULTIVATION.

Andrew S. Fuller, a practical horticulturist in Brooklyn, gave the Club a discourse upon the question, of great ability and interest. He stated that the only place where a complete collection of American trees can be found, was in the parks of the city of Paris.

Many kinds of valuable trees are becoming very scarce, and he therefore recommeneds that all the choicest sort of valuable timber trees should be planted, upon many an acre in this vicinity that is almost worthless for any other purpose than forest.

It is a fallacious idea that men must be professional nurseymen to grow forest trees. Every farmer can grow them as easily as he can grow corn.

He spoke of the immense advantage of surrounding prairie farms with belts of forest trees. In many cases a crop of forest trees would be more profitable there than any other crop.

He then gave a most interesting history of the planting of forest trees upon the estates of the Earl of Fife in Scotland. In some places, the trees were planted upon the sides of hills, so steep that men were let down by ropes to do the work. How many situations in this country of the same kind might be planted with trees?

Another anecdote of the sixth Earl of Haddington was given from one of his letters, which stated that his mother caused large bodies of forest trees to be planted; some of the land was a drifting sand when naked, and worthless for cultivation.

Mr. Fuller stated that he had grown seedling maples, to one year old, at an expense of $1 a thousand. He raised $40,000 seedlings upon one-eighth of an acre, at an actual expense of $18. I sow them in beds, one foot wide and three feet apart, covering the seeds only half an inch deep. The plants must be carefully hoed, and kept clear of weeds. The plants can be transplanted at one year old to rows four feet apart, setting the plants two feet apart, trimming off side branches and cutting off top roots. At two years old, several sorts of forest trees thus treated, will be twelve or fifteen feet high in rich soil. Then every other tree may be removed to other situations. The hickory must have the top root cut, to fit it for transplanting. It will grow much more rapidly also, and so will several other sorts of trees, by cutting the top roots.

As the trees grow in the nursery rows, you may take them out until they stand eight feet apart each way, which gives 680 to the acre. What these would be worth, of course depends upon circumstances.

The seeds of sugar ripen in autumn, but do not germinate till spring. The seeds may be sown as soon as ripe in beds, or mixed with moist sand in boxes, and kept in the cellar, or out doors, as freezing does not injure the seeds.

The American elm is one of the most ornamental trees, and of very rapid growth. The seeds ripen the first of June, and should be sown as soon as ripe, and a portion will germinate at once, but the most of them not until the next spring.

All forest tree seeds appear to require to be covered very lightly. They germinate best when kept continually moist.

Where land is plenty, it is best to sow coarse seeds, such as walnuts, hickorynuts, &c., in single drills, wide apart. This gives room for root-pruning, which should always be done before taking them up.

It is probable that several of our evergreen trees can be grown for profit as well as ornament. It is certain that many bare spots could be occupied profitably with some kind of forest trees, and their cultivation should be more thought of by American farmers.

Mr. Quinn.—In transplanting trees there is not care enough taken, and I ask Mr. Fuller how he would proceed.

Mr. Fuller.—One of the greatest difficulties about transplanting trees, is that the trees when taken from the nursery are good for nothing. There is too much bribery and corruption about all that are sold for public or private gardens and parks about the city. There are too many cases where the buyer is charged $2, the nurserymen getting $1, and the go-between the other dollar.

Wm. S. Carpenter.—I have found no difficulty in transplanting evergreen trees from the woods, if done in a wet day, and without exposing the roots to a chance to get dry.

Thos. Field.—There is not a remote possibility of one out of ten of the evergreens sold in this city living, however carefully planted. These trees are often kept two or three weeks out of the ground before they are sold, and then carried to the suburbs and thoroughly aired before putting into the ground. Hemlock should only be moved in May. Norway spruce and arborvtiæ may be moved at any time. Cedar I have never found the right time to move. I recommend the tap-root to be cut one year before the trees are moved from their native place.

This subject was still further discussed by several members, apparently with much satisfaction to a large audience of men and women.

The Club adjourned.

H. MEIGS, *Secretary.*

January 16, 1860.

Present—51 members. Mr. Richard G. Pardee in the chair.

The Secretary read his translations and extracts from the correspondence of the Institute since the last meeting, viz:

With special pleasure, we hail from the Argentine Republic, the first volume of agricultural fairs.

[Journal de la Société Impéiale et Centrale d'Horticulture. Paris, Oct., 1859.]

EASY METHOD OF MULTIPLYING THE VARIETIES OF THE AZALEA PONTICA.—BY MR. JÆGER (Gartenflora).

Whether branches are cut into a little, for the purposes of marcotting, (layering) the easier they break when pressed downwards, and if you lay them on the ground *without cutting, they take long time to root.*

Mr. Jæger has found a remedy. In spring he bends the branches (before the leaves are out) in a soil of *heath earth*, (Bruyère) heaped up and lays *a stone on it*, large enough to keep it down in its place without *bending the layer too much.* He then covers it with moss, and waters it *abundantly.* During the whole summer, in dry weather, he renews the waterings. In the fall, he makes a cover of *straw leaves and moss*, thick enough to prevent frost from reaching the layers, many of which at this time have roots, and may be detached next spring. But as many young ones will perish, it is best to let them be a year before detaching them from the parent stock, for then you will have strong, bushy plants. The roots are found under the stones and in the moss; but, above all, *under the stones.*

PEAR ORCHARDS—HOW TO RENOVATE AN OLD ONE.

Solon Robinson.—L. E. Fleming writes, from Indianpolis, for informamation upon this subject, being encouraged to do so from having read several times answers to inquiries made of this Club, that have been interesting and valuable. He says: "I have trees some twenty-five years old that have ceased bearing, from what cause I am unable to determine. Should they be manured, and closely trimmed? Should the soil be loose and dry?" I answer: The cause is that the natural food of the fruit has probably become exhausted, and the trees want feeding with fertilizers especially adapted to their necessities. Stable manure, of course, will be good, but probably muck, or wood mold, would be better. Ashes, leached or unleached, would be good; and so will salt, potash, bones, in powder or in the form of superphosphate. The soil at Indianpolis, is naturally loose and dry, but the pear orchard should not be used as a pasture or mowing lot.

Wm. Lawton.—I would add what Forsyth says, that old trees may be benefited by removing old limbs and rough bark, and fertilizing. In some cases two-thirds of the old top has been removed. The book is an English one, "Forsyth on fruit trees."

Wm. S. Carpenter.—I recommend cutting a trench around the trees about as far out as the ends of the limbs, and filling that with fertilizing substances.

Andrew S. Fuller.—That book is not to be had in this country; but the secret of the practice is excessive pruning and high manuring.

POROUS DRAIN TILE.

Solon Robinson.—Another letter writer wants to know whether the porous drain tiles lately exhibited at agricultural fairs, are an improvement. I answer: Yes, if they can be made on the farm cheaper than the common earthen tile can be placed there. I cannot see why the "porous tile," as those made of cement are called, are any better than those made of clay and baked, which appear as though they would last as long as earth itself, when well laid.

The Chairman.—I prefer stone drain to that of any kind of tile—porous or earthen. I have many rods of stone drain, that cost from $3 to $6 a rod. Still, I prefer them to tile at a much less cost. My stone drains never fail.

AGRICULTURE IN THE ARGENTINE REPUBLIC.

Judge Meigs, Secretary of the Institute, stated that he had received the Transactions of the first Agricultural Society and fair ever organized in that Republic. The Secretary read the following translation from the volume:

"The fair was held at Palmero, in Buenos Ayres, on the 3d of April, 1859. The Governor, Dr. D. Valatin Alsina, and others of the officers of government were directors, and this fair was ordered by a government decree of the 11th of October, 1858.

"The opening address of the Governor was brief but eloquent. He urges human minds and hands to help the mysterious works of nature by increasing and ameliorating all the productions of the earth, for these works give us wealth and pleasure and ennoble liberty and peace.

"The president of the board of directors, E. G. A. de Posadas, addressed the people. He stated that the value of the industry of the Republic in 1858 was 271,000,000 of pesos (dollars), without including a grain of corn or wheat! This shows the infant condition of our agriculture, notwithstanding the well-known richness of our soil, which will give us wheat on the grandest scale in the world. Our improved and important races of animals demand our attention. The inimitable cloths made by our Pampa Indians, our vast mass of wool should fix deep our considerations. The furs of the district of Azul would find marked rank at the World's Exhibitions of England and of France. Our able horticulturist, Le Blanc, has distinguished himself by his choice collections of vegetables, fruits, and flowers; his camelias of abundant shades and beauty have been recently introduced. The almost boundless fields of Sorgho Azucavado have proved rich last year, and the honey made from it abundant.

"The directors felicitate the government on the establishment of the fair, whose end will be great if we persevere; and persevere we must and will forever!

"On the delivery of the premiums of gold and silver and *honorable mention*, the Minister of Foreign Relations, Col. D. Bartolomee Mitre said: 'We gladly proclaim to the world all the names of those worthy citizens who have merited the premiums.' They are benefactors of the human race. They have set noble examples by applying their science and labor to the great work of enriching their country, by using its generous soil for new and better plants and for animals. They and their sons have gained titles more enviable far than the ensanguined laurels of war. Glory to them!

"Anciently, altars were raised to Ceres for wheat—she was crowned with wheat of gold. Mexico never forgets the three grains of wheat which covered the ancient lands of the Aztecs. Peru records with gratitude the name of Maria de Escobar, the Peruvian Ceres.

"In 1856, six bulls and one cow were introduced from Brazil into Paraguay. These have produced the countless millions on our pampas, &c. He spoke of the immense wool produced, &c., and concluded by saying, that by human intelligence and labor, the poorest animal, plant or flower can be ameliorated and exert happy influence over all men—much more so than the discovery by an astronomer of a new star in the immensity of the heavens."

The Secretary read another paper upon

MULTIPLYING AZALIAS.

If you will bend down the branches before the leaves start, into good soil, and hold them down with a stone, and cover the whole with moss, and keep that moist, you will have strong plants in one year, well rooted. So says the Imperiale Journal of Agricultural of France.

THE GROUND NUT.

A letter from G. F. Waters, of Waterville, Maine, giving his opinion about the ground-nut, that grows so common all over this country, in which he says:

"A few words reported from your club, last year, on the 'Apios Tuberosa,' or 'American Ground-Nut,' directed my attention to the same. The plant has been growing in a wet corner of my garden for years. I have obtained tubers two inches in diameter. I send inclosed a few slices from one of the large tuber, dried. You will find it rich in gums, starch, &c., with a taste like 'Snake Root.' There are two kinds of this plant indigenous hereabouts. I have not as yet distinguished them from each other by the flower. The tuber in one kind is quite round, and has a sweet taste, yellowish meat, &c. The other, which is the most common, tapers towards the ends, one being blunter than the other; meat white, sweetish, and quite gummy. It was recommended in your club to use rotten wood as a manure for this plant. I have found the 'Apios Tuberosa' to thrive best when well dressed with a rich compost; and so tenacious is it of life, that when once well under way in a rich soil, it will be found quite difficult to eradicate it.

"I have been told by one of our oldest inhabitants that many people lived upon this ground-nut during the winters 1817 and 1818, the nuts having been collected in the fall for food. The flower of this plant is quite showy and flagrant, the odor strongly resembles that of Orris root. This plant would thrive in swampy lands, where boys might harvest the crop."

The specimen inclosed was tasted, and the flavor and food-like taste of it in this dried conditien much admired by members.

Andrew S. Fuller.—This nut may be cultivated to advantage anywhere in this country. It is very nutritious, and will grow in great abundance in any rich soil. It grows very common upon western prairies and timber land. Undoubtedly many of the people of whom we have had accounts of their starving on the route to Pike's Peak, and in Minnesota, might without doubt have found this food-plant if they had only known where to look and how to designate it. It grows something like the small running pea vine. Its blossom is fragrant and pretty. It is a plant really worthy of more attention by the American people, notwithstanding it has grown wild and neglected so long.

HOT BEDS AND SPRING PLANTS.

This question was called up, and Mr. Quinn, farmer and gardener upon Prof. Mapes' farm, requested to give some information of his success in this line. He said: The earth for hot beds should be gathered from woods, or rich mold, and composted in summer, and well worked over, and in the fall covered with long manure, so as not to freeze. This is so as to have it in order for sifting when it is wanted. The manure is very carefully prepared—one part of it so as to heat, and one part not to ferment. The cold manure is first spread eight inches thick, and then a layer of hot manure, and then a layer of cold, and then covered with the prepared earth. The frame is made so that the sash will shed rain, and set on the bed, and the earth and manure filled in all around, and then the sash is covered with mats, and and seed not sowed for four days. The ground being carefully prepared, and seeds sown, the sash is kept close one day, and the second day opened. Some seeds start much easier than others. Cabbage seed would spoil before egg-plant seed would begin to germinate. We transplant from the seed beds to other beds, and we are careful to give the plants air, but it must be done with care, because the new plants are so tender that they are easily killed by too much air at first. We prefer a southeastern exposure for our hot beds. The size of each may be from 3½ by 5 feet, to 5 by 8 feet. The former we make 18 inches high in front, and 30 inches in the rear. Our frames are 4 by 6 feet, and the mats 5 by 8 feet, so as to lap over the edges, to keep the beds warm. We generally sow the different varieties of seeds in separate beds, as the plants require different treatment.

John G. Bergen.—The cabbage plants of the Long Island market gardens for early plants are grown from seed grown in the fall, and the plants preserved in cold frames. These cabbage seed are sown early in the spring, in frames like hot beds, but without heat, and these grow under glass, large enough to set, by the time the field is ready. Then the plants of the late cabbage are from seed sown in the open ground in April, May or June. The ground for cabbage plants should always be very rich.

Mr. Quinn.—We sow the seed for cold frames in September, and transplant in October into the cold frames, setting from 500 to 800 plants under a light of glass. The glass is covered in winter with boards, and air is given in mild days; and we sometimes set the plants out in the field so early that snow covers them without injury.

R. G. Pardee.—A neighbor of mine at Palmyra used to sow seed in open ground, and before freezing covered the plants with mats, and before winter he puts over a frame covered with boards, and on them earth, leaving one end open for air as long as he dares to, and then closes up both ends, and occasionally ventilating the bed during winter.

Mr. Carpenter, gardener, of Brooklyn, stated that he had successfully grown cabbage plants in a similar way to the above, using salt hay for a covering.

Mr. Fuller showed an improved form of glass for hot beds, rounding on the lower edge. This tends to keep the flow of water in the center.

John G. Bergen.—One of the most important things about growing hot-bed plants is giving them air judiciously.

Mr. Wheeler, of Wayne county, thinks this an important question for the country, if farmers can be taught so as to make cheap hot-beds for family use.

W. S. Carpenter.—My plan for a hot-bed for family use, is to prepare my ground in the fall by digging out the earth 2½ feet deep, and leave the sash on over that hole till March, when I put in the manure and earth prepared for the seed, and sow it. I plant corn and other vegetables in pieces of inverted sods, so as to take up the pieces of sods with the plants rooted in them. I have thus been able to get green corn the first of July. My hot-bed lettuce I do not pull up, but cut off, and the root sprouts out successive crops.

Mr. Wright, of Poughkeepsie, said that he used half turnips, in place of sods, for corn. He inserts the seeds in the turnip, and that rots, and the corn grows rapidly. Melons may be grown in the same way.

John G. Bergen.—Any farmer may put down a hot-bed about March 1, and fill in two feet deep of manure and dirt, and if he has no mats to cover with, he may cover with boards.

Mr. Pardee said that he had used oiled cotton cloth as a substitute for glass, with good success.

Mr. Gale said that he had known a good many persons grow early plants by sowing the seeds in sods, and keeping them in a warm place in the house until time to plant them out.

Mr. Wright.—In planting musk-melons, we are pretty sure to succeeed with the seed planted after the earth becomes warm. But I am able to get them forward very early by using the turnips. The great error of melon-growers is to put their seed in the ground too early. If the weather is chilly, the plants get a blight from which they never recover. This is obviated by the hot-bed culture, and the turnips add very much to the convenience and safety of transplanting. I have been able to construct a cold grapery much cheaper than such buildings are ordinarily built. It is of wood, with lath and plaster, and tan-bark filling.

Mr. Quinn stated that he had been very successful in growing Lima beans, planted in sods in hot beds, and other plants; also in small pots, removing the ball of earth with the plant when set in the garden. In transplanting cabbages, tomatoes, and other plants, I trim the roots and leaves. All tap-rooted plants should have the tap roots cut off at transplanting. Our plan of transplanting in the beds has this advantage—it hardens the plants, which are apt to grow spindling, and gets them into better condition for setting out in the garden or field.

PRESERVING DRIED FRUIT.

Solon Robinson—A Michigan housekeeper says that the best way to preserve dried fruit from getting wormy is to pack it in bags or barrels, and in May, or early in June, before the insects are astir to lay their eggs, to store it in a dark dry cellar, where it will keep for years perfectly sweet.

J. W. Briggs, of Maudon, N. Y., sends us a specimen of "Nectar," made from the "Honolulu Nectarine Squash," simply stewed and dried upon earthen plates, and it appears as though it would keep as well as any dried fruit, and will make good " pumpkin pies," without eggs or milk, as it presents a rich, pleasant taste, quite as saccharine as sweet potatoes. This specimen was tasted and much admired. We hope Mr. Briggs will send us a few seeds.

The next meeting will be on Monday next, at noon, when the subject of hot-beds and cultivation of early Spring plants will be further discussed, and it is expected that a paper will be read by Mr. Robinson, upon the uses and abuses of iron in agriculture.

The Club adjourned.

H. MEIGS, *Secretary.*

January 23, 1860.

Present, 71 members. R. L. Pell in the chair.

The Secretary read the following translations:

[Revue Horticole. Paris, December, 1859.]

GENERAL CONSIDERATIONS ON THE SUBJECT OF SPECIES.

Mons. Geoffroy Saint-Hilaire characterizes species as an assemblage (ensemble) of traits distinctive, common to a greater or less number of individuals, regularly and indefinitely transmissible by natural generation.

Mons. Chevruil says: Species is an organized, being, comprehending an indefinite number of individuals, having more relation among themselves than with all other analagous beings.

Mons. Hourous says: Species is a succession of individuals which live and perpetuate themselves. *Resemblance* is only a secondary condition, but the indispensable one is *descendance*. Learned men hardly agree in definition. The primitive source of the horse no more exists to-day than that of the ox; and we may say as much of the dog, the camel, the dromedary. The fossil horses do not differ from the living species, &c.

Note by Meigs.—We have no evidence of the creation of any plant or animal since the Genesis; nor any account of creation comparable in the slightest degree with that of Moses—neither in its geological views or creation of life; nor its chronology.

I have studied all the cosmogonies, and that of Moses, which is the only true one.

[Maison Rustique des Dames. By Madame Millet. Fourth Edition.]

Women are the good genii of the garden; they lead the two utilitarian men to love it, by showing how much charm it has for life. This book, of two volumes, has a full system of lady gardening clearly and explicitly taught.

Dwarf Nasturtium, *pumilum nasturtium* of de Cambessedes. The *Tom Thumb Nasturtium of the English* has honorable mention in the Horticultural Society of London. It resembles a dwarf geranium, has a fine red flower, and is easily cultivated. Mr. Edlington, of Winchhouse, cultivates fine varieties, profuse in flowers, and as tufted as the hedge primroses.

CEREUS TRINITATENSIS.

Mr. Herment, the able director and gardener-in-chief of the botanic garden of Caen, cultivates and admires it. It is a cactus. Its flowers are very beautiful, of a yellowish copper color outside, white within, of the diameter of 4 to 5 inches.

AMERICAN WINE AND BRANDY.

J. C. Provoost, (Greenpoint, L. I.) Having been frequently requested by my friends to make a statement of my process of making brandy and wine, I embrace this opportunity. I market none of my grapes, but take the best of them fully ripe for the first quality of brandy and wine. For brandy the grapes are thrown in a mill and ground until the seeds are fine, for I think that the fine flavor and much of the medicinal quality lies in the seed. They are then thrown into casks to ferment, which usually requires six or eight days, according to the temperature of the must. It is then put in the still, and the steam turned on with a steady heat. At the first distillation we can only obtain low wines, or brandy below proof. At the second distillation I pass it through the coolers, and the fusil being heavier than the pure brandy, is drawn off by a tap below, separating it from the pure brandy, which passes through the upper pipe down through the condensing tub into a receiver below. The second quality is made from wine and lees of wine, without fermentation, they having passed through fermentation as wine. This brandy passes through the second distillation, as the former, to remove the fusil.

The third quality of brandy is made from the cheese from which the wine has been pressed. It is thrown in casks and mixed with warm water, when it is left to ferment. When the must falls it is fit for the still.

My method of making wine is to slightly crush the grapes in the mill before pressing them, and after pressing, the juice is placed in open casks to ferment, that the carbonic acid gas may escape. After the fermentation has ceased, and the wine settled, it is then put in tight casks and bunged lightly for three or four days, when it is bunged tight. After the wine is taken out of the fermenting tubs, they are dried, and the tartar is then scraped from them, and they are again fit for a fresh must, after being thoroughly washed. By this process I reduce the quantity, but improve the quality and strength of the wine.

No artificial coloring or flavoring is used. In this respect it is unlike the French and other wines, which are all colored and flavored, to come under the different brands.

My wine, like my brandy, is made from the choicest seedling grapes and cuttings of America, which I believe are from Peoria. My brandy and wine are not foreign, but native American wine, native American brandy, and consequently have a native American flavor; and I, as an American, glory in my country's produce.

Solon Robinson read a letter from Samuel Myers, Columbia county, Ohio, which, after alluding to what was said here last week about growing seedling forest trees, says that in the woods of that county cart-loads of seedling sugar-maple might be gathered every summer, as the young trees grow to the height of six or eight inches.

The Chairman said, in answer to the question, that these seedlings can be successfully transplanted from the woods to the nursery row, and there grown until large enough to set out in place.

Several other members spoke of the great care that is generally required to transplant any kind of forest trees, especially those with tap roots. These should be cut off, and then at the second transplanting the trees will be much more likely to live.

A STEAM SPADING MACHINE.

Judge Meigs, the Secretary of the Club, read an account of a steam spading machine, in California, which appears very favorable.

SPECIES OF ANIMALS.

The *Review Horticole* of Paris, the Secretary said, gives a very interesting account of a discussion in the Academie upon the species of animals. The primitive source of animals is lost—the fossil bones of the horse are identical with those of the present day. There is no account of anything new in animal life, since the Mosaic account of creation.

NASTURTIUMS.

There is a dwarf nasturtium now much cultivated in England, and which is highly recommended.

Mr. Pardee.—The seeds of this "Tom Thumb Nasturtium" were imported into this city last year. I obtained one of them, though sold at high figures, and the result was highly satisfactory. The nasturtium is cultivated not alone for its fruit, as the flowers are very pretty, and of this dwarf sort particularly so.

GRAPE CUTTINGS.

Solon Robinson.—I see cuttings of the Delaware grape-vine offered for sale, with recommendations to induce parties to buy them because cheap—that is, of a lower price than the rooted vines. Now, by the way of caution, I will say that they are not cheap, at any price, to ordinary farmers and owners of gardens, or city lots, every one of which should have growing in it within three months a Delaware grape-vine, because it is one of the most hardy, most prolific, and easiest managed vines, and produces the best grapes ever grown by out-door culture in America. And because all this is true, I want to caution all who want the vine not to begin with a cutting. That might do for the Isabella, but it won't do for the Delaware. As cuttings are ordinarily planted in open ground, not one in twenty of the Delaware vine will put forth branch and roots, and live. It needs hot-house propagation and very skillful management to grow good Delaware grape-vines from buds. I intend, in the coming spring, to start two or three vines upon my little farm, and I shall buy the best rooted ones that Doct. Grant can furnish, without regard to first cost, because I believe it is better economy to pay $3 or $4 for a good root, than to get a cutting for nothing.

John G. Bergen stated that this was the universal testimony at the late Pomological Convention. It may be possible to grow Delaware vines from cuttings by the ordinary practice, but it cannot be recommended to any ordinary farmer to attempt its growth from cuttings or eyes.

R. G. Pardee.—I would recommend caution upon another state of facts; and that is, the liability to be imposed upon with cuttings of some worthless vine. The Delaware has obtained such a wide notoriety for its excellence that great care should be exercised, so as to be sure not to get a red Traminer, or something equally worthless. Therefore, I would say, buy your vines from men well known, like Dr. Grant, to have the genuine sort, and eschew all others.

Mr. Quinn, farmer upon Prof. Mapes' farm, recommended the same thing, as the Delaware is so difficult to propagate from cuttings, though well-rooted plants are hardy. It is, however, a vine of slow growth in the first years of its existence.

SPECIMEN CORN AND POTATOES.

Wm. S. Carpenter presented some specimens of improved King Philip corn, grown by G. K. Riker, of Stamford, Conn., which, it is said, grew at the rate of over 100 bushels of shelled corn to the acre. These ears were remarkably handsome specimen ears. There were also some beautiful specimens of "hominy corn," and also some very large *Prince Albert* e*potatoes*, whih have proved entirely exempt from disease.

John G. Bergen stated that upon Long Island this sort of potatoes had not proved as good as other sorts.

Mr. Quinn said that it was not esteemed as an early potato, but it is remarkably good at this season, and with us has proved entirely exempt from disease.

Mr. Gale said that he had grown a great many Prince Alberts upon various kinds of soil in western New York, and found it a very prolific potato, and the best that he ever grew. There is danger of over cooking these potatoes.

Mr. Carpenter said that the English Fluke and Napoleon potatoes have been sold for Prince Alberts, and have not given satisfaction. They look much alike, but are inferior to the Prince Alberts.

The Chairman stated that he grew eighty acres last summer, of his new seedling, free from disease, which were very prolific and good. The California potato, he said, he had grown several years, and it produced the largest number of bushels of any sort he ever cultivated, but it cannot be recommended for cultivation here.

THE NORTHERN SPY APPLE.

Wm. Lawton showed a Northern Spy Apple, which he stated were selling now at six cents each in the street. He thought, at such prices, farmers could afford to raise fruit.

Mr. Carpenter said it was a very shy bearer, and could not be recommended for general cultivation.

Mr. Pardee stated that the Northern Spy is one of the most valuable apples for spring use. It originated as a seedling in East Bloomfield, N. Y. It is a slow growing tree, and only bears well upon mature trees. It grows best upon clayey loam. The Norton Melon is another remarkably fine apple, which originated in the same locality.

Mr. Carpenter said that he could not recommend any one to plant the Northern Spy in this region ; it will not give satisfaction.

Dr. Wellington.—I think there is a great want of attention to the difference in soil in planting trees. What will succeed in one location utterly fails in other localities.

Dr. Humphrey thought the soil where the Northern originated was black muck ore—a limestone clay.

Mr. Pardee said it was not so in that part of the country. It was a soil, however, very favorable to apples.

Several gentlemen now called up the question, which has some time been pending, and upon Solon Robinson, who introduced it, to speak upon it. The question is : "Iron : its Uses and Abuses in Agriculture."

IRON : ITS USES AND ABUSES.

Solon Robinson.—Those who were present at our last meeting will remember that I promised to say something upon a subject which they then probably thought as barren, as they did that of the grindstone, which I once named as a fit subject for discussion in a Farmers' Club. That I said something interesting about the grindstone is proved by the fact that the papers have not yet done reproducing it; and that I may say something about iron that will be bearable, you will only know after you have listened to what I have to say. I only intend to say just enough to prove that we might talk upon the use and abuse of iron for a month without exhausting the subject.

The great importance of iron to civilization is not properly appreciated by men whose eyes are blurred with gold, from the nail in his cradle to the screw in his coffin, civilized man is in constant need of iron. Its uses are almost innumerable—its abuses altogether too numerous. Its uses in agriculture, as well as its abuses, are worthy of something more than a mere passing thought or careless word. Its uses upon the farm are so great that no farm can be cultivated without it; and the abuse of iron by the farmer is in using it in shapes entirely unadapted to the purpose to which it is applied. And still further, in not using it much more than he does for purposes where it is much more fit than wood, which many persons seem to be constantly trying "to get along with," so as to avoid the use of iron. For instance: I have seen in this country, within the present quarter century, a cart doing the work of a farm, in which there was not a single ounce of iron, and to this the horse was harnessed, without iron or leather. I have also seen many an ox-cart built without iron, and the oxen fastened to it by raw hide or leather thongs, carefully avoiding the use of iron about the yoke. I have seen oxen also fastened to a plow without a chain, and the plow itself almost as destitute of iron as the cart and yoke. And some wooden-headed farmers are still to be found in the midst of civilization dragging over their fields a wooden-toothed harrow. The same class ignore the use of iron axles to their wagons, or of iron-shod sleds, which glide so smoothly over the winter snows, that a horse forgets he is carrying a load. But these are the men who abuse instead of use iron. Iron! a metal more precious than gold, for that metal is only obtained in the minutest quantities without the aid of iron.

Passing by the gold-digger, so far as the production of food is concerned, as of but little more use in the world than the digger Indian, let us look a little more more minutely at the uses of iron in agriculture.

The pioneer of the forest, who goes into the woods to build a log-cabin, the very nucleus around which all the comforts of home are to cluster, can do nothing without iron. He must have an ax with which to strike the first blow toward a civilized man's habitation. In fact, until within a few years, he could not start his first fire in the woods without iron. But now, the friction-match has superseded the flint and steel; but iron he must have. What could he do without it? The wagon or cart that carried him to his new home would be a poor affair without iron—though such are still to be found in some parts of the United States, or rather in the territories lately acquired from Mexico. But with us, our carts, wagons, sleighs, sleds, are partly composed of iron. We have learned its value in these implements.

Now, after the occupant of his new forest home has arrived upon the spot, where wood is in superabundance, he can do nothing without iron. He may have a wagon-load of gold, and find it useless if, with it, he could not purchase axes, wedges, mattocks, crowbars, chains, plows, harrows, shovels, spades, forks, hoes, et cetera, with his gold.

And then, after all his iron wants are supplied, just look at the uses of iron inside the house. It is true that a fire-place can be made of sticks and clay, and the pot that cooks his dinner may be of copper, suspended from a wooden hook. And so may be many, or all the culinary utensils, of some other metal, but how the poor man's gold would melt away in the purchase of such things as were actually necessary, of copper, zinc, or brass. Let every woman take a look at at a well-furnished kitchen, and think of the uses of iron. From the convenient cooking-stove, the articles of various form and use, down to the iron skewer that holds her joint while it roasts, are "too numerous to mention." Without iron, we could not kill, and dress, and cook, and eat our meat; and the stones that grind our grain for bread are kept in order by the use of iron.

The household conveniencies of iron are already so great as to be almost inconceivable, except when we take a careful retrospect. And wood is being superseded with something new of iron, in the way of house-furnishing, every day. I ask those who have never reflected much upon this subject to stop, in some of their walks along Broadway, a little above the City Hall Park, at Hutchinson & Wickersham's store, or sample- rooms of iron furniture, iron fencing, and iron railing, and they will learn a useful lesson of the uses of iron. They will see bedsteads entirely of iron, even to the slats that support the bed, which are not only good, strong, and durable, but light and convenient, and truly elegant. They will also find tables, of various sizes and patterns, the most appropriate ever made for the farm-house. Chairs, too—not heavy, cumbersome things, but light and tasty—they will find made entirely of iron. And—what every farm-house should have —they will also, find at moderate cost, screens for the milk, cellar, and pantry windows—suitable to any purpose, whether to exclude burglars, cats, dogs, or flies.

To what manifold purposes you will see iron is adapted. That store is a great iron museum, well worth a visit from countryman or citizen.

Ah ! the fence. Don't forget if you will build fences, to look how beautiful, or how plain and cheap, it can be made of iron.

There is one more use of iron on the farm that is entirely too much neglected. No farmer who owns a well or cistern can possibly afford to be without an iron pump. He cannot use wood as a substitute, because the mere lifting of the water from the bottom of the well is but half the use of the pump. It should be at once a suction and a force pump—a perfect little fire-engine—such as the one known as "West's Improved Pump," which I do not think costs over $25, and which will draw water from a well 25 or 30 feet deep, and throw it through a hose to the house, and into any room that might be in flames. I speak of this pump merely because I happen to know it better than any other, and know it to be very simple, durable, powerful, and cheap; and it don't freeze up, nor get out of order once a year. There may be others with equally good qualities that I don't know. I know this, and think I may be doing the farmers good by speaking of it. I know that no farmer can possibly afford to do without this, or some other equally valuable iron pump. I urge them to think of it. A boy ten years old can work it, and throw a continuous inch-and-a-quarter stream. Think how quickly a lot of cattle could be watered. Think, too, of the garden, during a drouth. The children would take turns in pumping and holding the hose, to throw a shower every evening over their favorite flowers and the parched vegetables. Upon many farms, such a pump should be attached to a wind-mill, and water elevated for all purposes, as it can be made to work in deep wells, as well as shallow ones.

In short, it should be impressed upon the mind of every farmer in America, and, in fact, upon the owner of every house and well or cistern in the country, that his greatest safeguard against fire is a good iron pump. It is better than a policy of insurance, and will not cost half as much.

I have said nothing of the uses of iron in all mechanical operations, nor of its use in building ships and houses, because its purposes are innumerable. My object has been to induce farmers to think a little about the uses of iron in agriculture, and that there are many purposes to which they may apply it, that some of them have never taken into consideration.

The use of iron agricultural implements is increasing almost beyond belief. Fifty years ago an iron plow was unknown. Now we have them without a particle of wood. So we have iron harrows, iron cultivators, iron planters, iron harvesters, iron thrashers, and iron mills. It is, in short, an age of iron. It is an age too, of reason, and farmers should reason together upon the new uses to which iron has been applied to facilitate the farmer's business, and then each one should inquire of himself and his neighbor whether he has adopted all the improvements in iron agricultural tools which he could do with certain advantage to his business.

Among other good uses of iron which I have lately seen, is the use of a common iron pot—that old fashioned, round-bottom dinner-pot—for the feed-box in a horse-stable. Iron pig-troughs have been some years in use, and are to be commended, except where wood is cheap and labor cheaper.

As this is such a day as we look for to make maple sap flow, I am reminded of the great convenience of using iron for the spouts to conduct the sap into the buckets, which should be made of iron, either tin-plate or galvanized, with an iron-wire rim, with a loop in it to hang upon an iron nail driven into the tree.

Speaking of nails, what an abuse of iron it is for farmers to live, as many do, almost destitute of them! It is better economy to have a pound of them wasted, than it is to do without one when it is needed. None but the most shiftless of farmers—just such as would do without a grindstone—would try to get along without having a hammer and nails always at hand.

There has lately been patented by Mr. Selleck, of Greenwich, Ct., a process of hardening wrought iron, that promises great benefits to farmers. In the extraction of zinc from the ores of New-Jersey, a new metal, or rather iron in a new form, was found. It is probably a silicate of iron, and is called Franklinite ore, or metal, and is worth no more than any other iron ore—hardly as much for the manufacture of iron—because it can be used only in small quantities, mixed with better ores. Now this metal will melt at a welding heat of wrought iron, and it has such an affinity for it, that if a little piece is placed upon the hot bar, it melts, and spreads over the surface, just as a lump of tallow does upon a moderately-heated iron, and like that, it seems to incorporate itself with the surface of the iron, and is malleable while hot, but, when cold, is so hard that no one can touch it. The corks of a horse-shoe, to which this Franklinite metal has been applied, are as hard as glass. The importance of this great, good, cheap improvement in iron manufactures for farmers, is wholly incalculable. We hope they will not abuse this discovery, by neglecting to proffit by its use.

Now, lest you should say that I abuse my subject, by subjecting it to too long a trial of your patience, I will barely allude to the greatest of all abuses that iron is ever put to about a farm, and then hold up for some one else to go on with the subject.

This greatest of all abuses is in the form of bird-murdering shot guns, which I expect to hear popping all round the country, a few weeks hence, just as the little songsters are preparing nests for the propagation of their species.

Now, in an old settled farming country, like this around New York, the best possible use that iron can be put to in the form of a shot gun, is to shoot every prowling vagabond that comes upon your farm, blazing away at your birds, yours as much as the trees they light upon—yours as the turkeys, geese, ducks, chickens, doves, around your barn, for you bought them with the land—and none but a villian too base to live will come upon your premises to destroy your most valuable friends, the birds. The use of iron for their destruction is the worst abuse it was ever put to on a farm. It is worse than using a wooden shaft and crank to a shankling old grindstone, or a wooden trammel to hold the dinner pot over the wood fire in a wooden chimney.

John G. Bergen thought there had been a very great abuse of iron at Lawrence, Mass., lately.

Wm. S. Carpenter.—Mr. Robinson spoke of a kind of iron pump for farmers. He says that this pump will not freeze. I wish he would tell us why it will not freeze, as that is a great difficulty with me.

Mr. Robinson replied.—The pump is fixed below the platform in the well, and as cold weather comes on, a little plug is pulled out of the bottom of the pipe that sends the water up to the spout, so that all above the platform runs back.

Dr. Wellington spoke of the great benefit of iron to the farmer in its use in fruit growing. The scales of a blacksmith shop are highly valuable, simply placed around fruit trees. He detailed several experiments, not only in producing fruit, but improved vegetables, &c. He thought all the dust and sweeping of foundries could be saved and applied to all kinds of stone fruits to great advantage.

Mr. Carpenter said that he had witnessed some very remarkable results from the use of iron dust upon fruit trees.

Dr. Humphrey said that he had found an application of iron to grape vines highly beneficial, and he thought that the value of iron in agriculture was very little understood. It is a great abuse of iron not to apply all that can be conveniently obtained from smiths' shops, or other iron works, to our fruit trees.

Ehlert Miller thought that the results witnessed from the use of iron did not arise from the plants taking up the iron, but from the ammonia which the plants obtain in consequence of the application of iron.

Dr. Wellington urged that experimenters should mix with the iron some finely pulverized zinc, so as to produce a magnetic action.

The Secretary said that iron enters into the composition of all things, animal and vegetable, grown upon the farm, and it is of the highest importance to know how to use it as a fertilizer.

The next meeting will be held at noon on Monday, Jan. 30, when the subjects of "Hot Beds" and "Spring Cultivation" will be in order; also, the subject of "Iron in Agriculture," and "Fruit and Forest Trees."

The Club then adjourned.

H. MEIGS, *Secretary.*

January 30, 1860.

Mr. Doughty, of New Jersey, in the chair. Present 100 members.

The first hour being devoted to miscellaneous business, several subjects were introduced and discussed.

GENERAL INFLUENCES OF FARMING.

Wm. Lawton addressed the Club upon the general influences of agriculture upon the character of the people, and upon the econemy of its pursuits.

THE BALDWIN APPLE.

Mr. Dan. Weed, of Northampton, Mass., introduced a specimen of this apple, and made some remarks upon its value.

Wm. S. Carpenter thought it likely to take the place of the Newton Pippin. It is a favorite in all parts of the country where known. It is an apple of excellent flavor, and its value ought to be universally known.

BONES—HOW TO PREPARE THEM.

Solon Robinson read a letter from S. Jaqua, of Paterson, asking how to prepare bones on the farm for use, which elicited a long discussion.

Wm. Lawton prefers to use the bones whole, for grape vines, and let them decay gradually.

Mr. Quinn.—If we put bones in whole they will last 25 years in the earth. Now the question is, whether it is not better to prepare them, so that crops can appropriate them all in five years, which can be done if the bones are properly prepared. The best way for a farmer is to dissolve his bones with sulphuric acid and the common oil of vitrol of the shops.

TO DISSOLVE BONES.

Use sulphuric acid diluted in nine times its bulk of water, in an old oil barrel or other vessel, and put in the bones and they will dissolve, or you may dissolve them in potash ley. Bones are a long time dissolving in a manure heap, and they are much more valuable in a dissolved form than whole or in bone dust.

Wm. S. Carpenter.—If bones are purchased in the form of dust, the plants will soon appropriate them.

Solon Robinson.—Yes, but the question is how to prepare the bones accumulating on the farm.

Andrew S. Fuller.—Put bones in a cask of moistened wood ashes, and they will dissolve. Then use ashes and bones together. No matter how much ashes you use.

R. G. Pardee.—I have tried the plan of dissolving bones in diluted sulphuric acid, and have not succeeded; and I have used the acid one to four of water, and joint bones did not dissolve in a year. I have also used potash, and did not succeed. I do not believe bones can be dissolved unless previously made very fine.

Solon Robinson related a little personal experience, where he had failed to dissolve bones in a strong solution of potash.

Adrian Bergen said that he esteemed bones an excellent manure, but he could not find any way to reduce them to fineness readily. He also cautioned farmers about buying fine bones as sold in market.

Wm. S. Carpenter said that he did not believe that whole bones of the farm could not be used to advantage, except in the grape border.

Mr. Wheeler related something about a grape-vine planted over a spot where an ox was buried, that grew mightily.

John G. Bergen.—I throw my bones in a brush heap and burn them, and distribute the ashes.

Mr. Lawton.—A single bone may afford all that is needed by a grape-vine. I would put bones near all grape-vines.

Dr. Humphrey.—Bones to be of value, must comminuted. A vine may get nourishment from a whole bone, but plants generally cannot, and will never be benefited by whole bones, until they decay.

Mr. Pardee.—I believe bones are valuable for all plants, if made fine. If to be dissolved in acid or potash, first break them with a sledge, as fine as possible—that is the only sure way.

Solon Robinson suggested that bones might be burned to more advantage in the stove; that they are worth as much per ton for fuel as coal.

Dr. Trimble.—If you can't get your bones ground pound them all, but don't burn them—that destroys part of their value.

Andrew S. Fuller.—I have lately examined a vinery that was planted where bones had been applied by thousands of bushels, and not a vine has ever profited by this application of large bones.

Mr. Quinn.—I have lately tried the experiment of dissolving bones in sulphuric acid,(oil of vitriol,) mixed with nine parts of water, and the whole bones dissolved in three weeks. In burning bones we do not lose any of the mineral value of the bones. All the commercial super-phosphates are made of burnt bones.

THE HONOLULU MOUNTAIN SQUASH.

Wm. S. Carpenter presented a specimen of the above named squash, and stated that it would make excellent pies without milk or eggs. It is a good bearer, and quite new. A few of the seeds were distributed.

THE WHITE LEGHORN SQUASH.

A specimen of this squash was also exhibited, and Mr. Carpenter stated that they grow to the size of 150 pounds each, and are very productive and rich. Both are excellent keepers, and well worthy of extensive cultivation for the use of man and beast.

RULES FOR A FARMER'S CLUB.

Solon Robinson read a letter from E. C. Parkhurst, of York, Penn., as follows:

"We are about getting up a Farmer's Club, and my object in addressing you is to get some information about getting it up. We presume you have printed by-laws for your Farmer's Club, in New York. If so, will you please send us a copy. If not, any information you may be pleased to give us will be thankfully received by a large number of the subscribers to The Tribune."

Mr. Robinson said—I am in constant receipt of similar letters, and I will take this opportunity to answer. 1st. This Club has a set of rules, printed in a volume of the Transactions, occupying just twenty five lines, and that is just twenty five more than is necessary; for these are not referred to once a year by one of the hundreds of persons who attend our meetings, and I presume some of them don't know that we have any rules. There is a rule to meet at noon on Monday, generally once a week, but may adjourn over two weeks or more. At each meeting we agree upon some one or two questions to be discussed at the next meeting, and sometimes a a member comes prepared with a valuable paper, or talk upon that question. The meetings are open to everybody, and everybody conducts with decorum. The attendance varies from fifteen to a hundred and fifty, and one fourth of the number is frequently made up of intelligent women. The Secretary calls any one who may be nominated to the chair, and proceeds at once to business, with any matter in hand, of a miscellaneous character, or anything that any one present wishes to talk about. At 1 o'clock the questions of the day are called up, but may be set aside if there is other more interesting matter. Punctually at 2 o'clock the meeting is adjourned. The whole meeting is conversational, and never controversial, and nobody makes long speeches, or if they do, they are considered bores, and are invited to shut up. My advice to every farming neighborhood that can master ten intelligent men, who will attend a Farmer's Club, is at once to form one. But don't make any formal constitution and by-laws, or conventional rules; but make your meetings social and conversational. Let your organization be of the simplest form possible, and avoid all formality in your meeting, except just enough to preserve order Let one man act as Secretary, to keep a few simple minutes, and advertise meetings, and let them be open to everybody without fee or membership; and if money is needed, ask anybody and everybody to contribute. If they won't do it, but leave all the burden of the expense and business of the Club, to rest on the shoulders of three or four persons, give it up. The time has not come for a Farmer's Club, in that neighborhood. It is a good plan, in the country, to meet at each other's houses; but to succeed, you must get your wives and daughters interested A Farmer's Club is a barren wilderness, unless smiled upon by woman.

Mr. Quinn spoke of the practice of meeting at each other's houses as an excellent one, where the members examine the farm and criticise all connected with it.

Several other gentlemen spoke in high terms of commendation of the suggestions for forming Farmers' Clubs, as proposed by Mr. Robinson.

PLANTING GRAPE-VINES.

Peter G. Bergen asked the best method of planting grape-vines.

Mr. Fuller answered: Let the soil be dry, deep tilled and well drained. It need not be extra rich. In fact, it may be too rich. If too highly manured, a vine produces wood abundantly, but not fruit.

Mr. Bergen said that wild vines grow around swamps, where the land is wet.

Mr. Fuller replied that wild vines do not grow in swamps, but on the borders, where the top of the soil drains naturally. If vines grow in wet soils they are not fruitful.

IRON—ITS USES AND ABUSES.

This, one of the regular questions of the day, was called up.

Peter G. Bergen, of Long Island, inquired how iron could be used to advantage on the farm.

Mr. Pardee stated that he had used blacksmith's cinders to good advantage upon various fruits.

Mr. Lawton said that lime, neutralized iron in the soil, and that was one of its greatest advantages in agriculture.

Mr. Gale thought that the worst abuse of iron was making agricultural implements of iron so light and poor that they were worthless. I have been in the practice of plowing twelve to twenty inches deep, but I never could buy a cast-iron plow that was heavy and strong enough to stand the work. Our horticultural tools are beautiful, and some of them are good, but heavier tools are many of them worthless.

Peter G. Bergen.—We have very little iron in the soil of Long Island, and I want to know whether I can use iron to advantage as a fertilizer. I can obtain it cheaply, but I don't know what effect may be produced by an over-supply.

Dr. Humphrey.—In small quantities, iron is doubtless beneficial to fruit trees; when in excess it is injurious.

Mr. Quinn.—In the heavy clay soil of New Jersey, we have iron in the soil, and it probably has a beneficial effect upon fruit trees. Analysis generally shows iron in all soils. I think the greatest abuse of iron in agriculture is to let tools lay about till destroyed by rust. However that may be a good way to get iron into the soil. Iron oxyd is not injurious to any soil or crops.

Andrew S. Fuller.—I have read a good deal about the advantage of iron to fruit trees, but I have yet to learn whether iron is a fertilizer, or whether the iron is a conductor of electricity that improves the soil. A neighbor of mine had a grape vine planted along side of a lightning rod that outgrew another vine a few feet away, more than two to one. Now, was it the iron or electricity that produced the effect?

John G. Bergen said that he knew of some experiments some years ago, with electricity, but it did not do much good.

Mr. Quinn thought the extra digging to set the lightning rod had more effect upon the grape-vine alluded to, than the iron, or the electricity.

Mr. Cavenach said that he had used iron dust to some extent upon flowers, to heighten color, but thought there was some danger in using it freely upon tender vegetables.

Solon Robinson inquired if iron was ever injurions to plants, unless in connection with acid; and if that was not why lime produced a good effect upon soils over-charged with iron, that it neutralised the acid.

The next meeting will be held Monday, Feb. 6, at noon, and the subject of iron may be further discussed. Also spring planting, orchards, and muck or peat, its value, and how to apply it.

The meeting to day was very full, and quite interesting, but we give only a brief outline of what was said.

The Club adjourned.

Wm. LAWTON, *Secretary pro tem.*

February 6, 1860.

Robert L. Pell, in the chair. Present 56 members.

The Secretary read the following paper:

We recommend to our members to examine their transactions; among others, the great question of destructive insects, and the remedy and prevention, by Dr. Fitch. It appears that we shall have to import and breed armies of their enemies. We see no difficulty in bringing over the ichneumon fly, who must live on our wheat destroyers.

We ought to have before us all the works on this subject and study them.

Drury, of London, a tallow chandler, becoming deeply enamored of the study, expended a quarter of a million of dollars, in his beautiful work, which, as to some insects, is the most interesting for its extreme accuracy of text and illustration. Donovan, of England, also labored for a lifetime in the same insect family with great success. France had her patient, laborious investigator, in the justly celebrated Latreille, whose calm and philosophical mind was also for life devoted to it, and Fabricus, of Denmark, who studied at Copenhagen, London, Edinburgh, and at Upsal, under Linnæus; he was enthusiastic in the study, and published six works on insects; the last was published in 1794. With such pioneers as these, and such valuable aids as our Harris, Fitch, and others, we must and shall understand for real practical purposes how to command these little, but terrible enemies.

Of the ichneumon family, not yet perfectly known, the great entomologists have named the following genera, each genus having species, viz: Cryptus, bassus, pimpla, joppa, metopius, trogus, alomya, peltastes, ophion, bauchus—10 genera. Latreille subjected them to daily scrupulous investigation. The vast labor bestowed on the entomologist branch is so much gained as vantage ground for us. We must carry it out to fully utility, by practical operations. As the object is great, indeed, so will be the triumph of the great victors of enemy insects.

ILL-CONSTRUCTED DWELLINGS.

The Secretary read an interesting article upon the ill-constructed dwellings of America, and the great want of improvement in this respect. There is a great need of schools to teach the art of building, not for show, but utility and convenience of arrangement.

ENGRAVING GROWING FRUIT.

There is a simple method of engraving names upon growing fruit. When the fruit is about half grown, cover one side with wax and write the name in the wax, cutting through to the skin. When ripe, take off the wax, and the name will appear on the fruit.

PRESERVING PEARS.

W. S. Carpenter exhibited several specimens of summer pears, including Bartlett's, in perfect preservation, preserved in a marble vault in the centre of an ice-house. The person who preserved these pears is Robert Benner, of Astoria. He is able to keep the thermometer at 36°, and this will keep any kind of tender fruit, simply stored in the vault, without any packing. The vault is surrounded with some six feet of ice, top and sides, except a small passage-way into the vault.

SWAMP MUCK.

Solon Robinson read a letter from A. B. Chadsey, of Wikford, R. I., which, after speaking in high terms of the interest taken by the country at large in these discussions, asks for information about muck, as follows:

"What is the best method of preparing peat to be used as a fertilizer?

"Will shell lime, or wood ashes and salt, sufficiently neutralize the acid?

"If so, what quantity of either of the above substances, or combined, should be used to the cord of peat; and how long will the compost require to lie before using?"

He says:

"Peat, composed of vegetable and woody substances, found in swamps, is available in large quantities in this vicinity, and the information sought will be highly appreciated by myself and fellow farmers."

Mr. Pell stated that he preferred to haul muck into the barn-yard and mix it with the manure, and then cover the mass with lime, which penetrates and disengages ammoniacal gasses, which he secures by spreading charcoal over the heap. Liquid manure is applied to the heap before the charcoal. The dust of coal is a very valuable substance on a farm. Lime will sufficiently neutralize the acid in muck. So will exposure to the atmosphere for a long time—say two or three years. About 1½ bushels of lime to a cord of muck will be sufficient to neutralize the acid in muck. The most economical application of all sorts of manurial substance is in a liquid state, as is now much practiced in England. The best manure for a sandy soil is clay. I consider the plow a bad implement. We use it for want of a better one. It consolidates all the earth that it does not turn up. So does the harrow. It hardens the earth at the point of the teeth. There is a great difference in the character of muck. That from the surface will always produce the best results at first, or if used without preparation.

Mr. Smith, of Connecticut.—I take out muck in August, and apply two loads of muck to one of manure, and it is ready for use the next spring. Gypsum does wonders with me, but lime does no good. The best way, if we have but little muck, is to put it in the pig-pen. I never heap any manure. I prefer to keep it spread so it will not heat.

Mr. Cavenach, gardener.—I have used muck fresh, in potting plants, without trouble from sourness.. But I prefer to mix it, two loads to one of manure.

Mr. Garvey.—No directions can be given without knowing the exact constituents of the muck to be used.

The Chairman.—I had my muck analysed, and found some of it almost equal to cow manure.

FUNGUS IN HOT-BEDS.

Mark D. Wilson, of Bloomfield, wants to know if there is any way to prevent a sort of mushroom fungus growth in hot-beds, which starts in bunches, raising the earth so as to throw out the plants, and producing a black dust, probably the seed, which blackens the cultivated plants. He tried lime and salt mixed in equal quantities, spread half an inch thick, which seemed to stop the fungus growth. But then plants have to be grown in pots or boxes set in the bed. He hopes some member of the Club can tell him how to prepare hot-beds so that they will not be troubled with this fungus pest.

Mr. Carpenter suggested that there was not soil enough used on top of the manure.

The Chairman.—I mix salt with my hot-bed compost, and am not troubled with fungus.

EARLY SPRING PLANTS.

Mr. Carpenter.—I have brought forward early peas, some ten days in advance of the usual time, by setting up a board on the north side of the row. The earliest peas I know of are called Daniel O'Rourke peas. I have had peas covered with snow without injury. Beets may be planted very early without injury from frost. The Bassino beet is the earliest. I plant sweet corn from April 1, to July 4. The Excelsior is the earliest variety. Stowell's evergreen corn is the latest kind of sweet corn; it is very prolific. I have used guano in the hill, three inches below the seed, to the best advantage of any kind of manure for early corn.

Mr. Gale related some experiments of a man in Dutchess county, in selecting the earliest ears for seed, which he continued for five years, until he got seed that ripened earlier than any other kind that he could procure.

The Chairman spoke of the efforts of Mr. Baden, some years ago, in producing corn that always ripened five or six ears to a stalk.

Mr. Smith.—No good farmer will use corn for seed that does not come from stalks that bear at least two ears.

Mr. Cavenach.—Early peas, &c., should be covered with salt, hay, or litter.

The Chairman.—I start all my early plants in cold grapery, and then transplant to the open ground, set in hills made rich by good compost, and cover the hills with glass boxes. Field corn on the Hudson should not be planted till June 1. Early corn I start April 1. Melons, &c., I have started Feb. 1. I pluck off the blossoms of vines so as to let them bear only a small number, and all perfect. I thumb-prune all running vines. He then related a fact about a Frenchman, who grew enormous watermelons at Hyde Park, up the Hudson. He started the plants in hot-beds.

Mr. Cavenach.—We always shorten in cucumber vines and melons to great advantage.

DESTROYING BUGS.

Mr. Gale.—The best way to destroy bugs in a melon-patch, is to lay shingles on the ground near the hills, and look under them before sunrise, where the pests all harbor, when they can be easily destroyed.

Mr. Smith.—My remedy for grape-vine bugs, is to scatter gypsum on the wet leaves. It is also largely used near Hartford, upon melon vines.

John G. Bergen.—We have the rose bugs with us, but having plenty of rose-bushes, they do not trouble the grape-vines. It is a good preventative to plant roses near vines.

Mr. Smith urged the trial of gypsum to prevent the depredation of the rose bugs upon all kinds of plants.

Mr. Smith described a very destructive bug that is new to him. It is something like the corn bug, but much more voracious, and very destructive.

Mr. Carpenter described another terrific destroyer, known in his neighborhood as the potato bug, which will eat up a whole crop, and then leave the potatoes for any other crop. I drove them from my field by sowing powdered lime.

Mr. Gale said the same bug was destructive in Central New York, last season. They make their appearance in July.

Doct. Trimble.—The bug is the *Sytea Americana*-the American blistering fly; it is destructive only occasionally of growing crops.

Mr. Carpenter.—I consider this one of the most alarming bugs that infests this part of the country.

Mr. Smith.—The bug I speak of is so plenty in Ohio, that it destroys gardens entirely. It preys upon my apple trees and various other things.

Mr. Seeley.—An infusion of aloes is highly reccommended to keep off bugs.

Mr. Smith.—I have tried that, but prefer the use of gypsum.

Mr. Carpenter.—A neighbor of mine uses quassia infusion to keep off bugs, and finds it quite successful.

John G. Bergen.—I dont know a better remedy for bugs on cabbage plants than dust from the road.

The Chairman.—The ordinary powdered gypsum called plaster of Paris, is not a manure, but improves its crops by the sulphuric acid it contains. But it may be used in too large quantities.

CULTIVATION OF FRUIT.

This subject was called up, and an interesting communication from S. P. Landers, of Clinton, N. Y., was received by the Club with great satisfaction. The title of his paper is:

PLANT APPLE TREES.

"You urge the importance of planting apple trees. Such exhortations cannot be too often made. Planting fruit-trees is a business too little discussed in the papers, and too little practiced by the farmers. How often we hear men regretting—old men and men in the prime of life, that they did not turn their attention to fruit growing in their younger days; but now they say it is too late—we should never eat the fruit. Such men have no thought of leaving the world any better than they found it, in this rspect; and seem to be satisfied with their selfish reasoning and continue to plow their fruitless and treeless farms till their land and their lives are worn out. Their children and the rising generation, have to suffer for their sins of omission. It is certain that our old orchards are fast going to decay, and very many of them are worthless, and indeed always were, except to raise apples for cider and stock. The warm, and freezing winters, we have had for the last three years, and particularly the warm February, and the freezing March, of 1857, have been very destructive to fruit trees, both young and old, in this section of country. This has had a discouraging effect upon the timid spirits of our farmers. The midge destroys their wheat, and theit potatoes rot, but they try again. The fly eats their barley, and the frost kills their corn, and they try again; but not so do they reason and act in planting orchards. There are but few old men who can remember a winter that has been thus destructive to fruit and even forest trees, like the one already alluded to; and the same circumstances may not occur again in a century. Aside from the profit there is in growing fruit, there is something pleasant to every person of taste; and who has not this taste, to see a tree he has planted put forth its buds and leaves every spring, and lengthen out its branches every summer, till he can sit under its shadow and eat of its fruit?

"A farm dotted over with trees, especially fruit trees, is a pleasant sight. An orchard in full bloom is beautiful, and it certainly is beautiful when in full fruit.

"Some fifteen years ago I commenced growing trees in a small way, in a nursery, and planting out into an orchard all the ground I posess, and if I owned a thousand acres, I should do the same with all the land that was suitable for trees.

" We find men every day who are restrained from planting an orchard for fear that fruit will become worthless and unproductive to the producer. They cannot comprehend how the millions of nursery trees now being grown, can be planted out into orchards and bear fruit and have the fruit worth anything. They do not seem to comprehend that the increase of population is greater than the increase of fruit. There are millions of children being born, and every child has a taste for fruit, and a tooth to devour it. There need be no fear about fruit being worth less than at the present time.

" There is no way a farmer can increase the price of his land so fast as by the growth of fruit trees. The growth of trees on every acre of good land, well cultivated, and set two rods apart each way for the first ten years, is worth $20 per year, and after that still more. The trees on an acre thus planted, when ten years old, are worth $5 a piece, or $200 the lot. No farmer who consults his interest would sell 40 trees, 10 years old, for $200. I have trees that have been planted out 12 years, that pay the interest of more than $50 each, beside the expense of picking and packing. But it requires judgement and experience to set out and grow an orchard as it should be. All land is not suitable, and all men are not judges in selecting the best and most profitable fruit for an orchard. There are many things to be taken into the account, both in selecting a location and soil for an orchard, and the best fruit to be planted. A man wants to plant an orchard, and he often makes his selection of fruit from the largest, smoothest, and handsomest kinds he finds on exhibition at some agricultural fair, without taking into the account the real value of the fruit. He could not make a worse mistake. Some varieties that are really excellent are not worthy of cultivation from the defects they have. The tree is a poor bearer, like the " Northern Spy." The fruit cracks and grows bad, like the Spitzenberg. The tree sheds its fruit prematurely, or it is not good to keep. All these and other qualities should be considered when trees are selected to be planted in an orchard.

"2. Having selected his trees with reference to profit, and got the best kinds of fruit, how shall he plant them?

"Two rods each way is about the proper distance to plant an orchard. On some land a larger distance is necessary, and on some less will do.

"Make the hole for trees large and deep, and instead of putting the best soil in the bottom and making it rich, inviting the roots down there for a repast, fill it with stone, gravel, sand—anything that will drain off the excess of water. This method all experience proves better than to fill with manure or any rich soil. Then place in the tree, being careful to have all the roots put about in the same position as when growing in the nursery. The principal secret of success in making trees live, is to have the fine earth well mixed among the roots, and then good cultivation will make them thrive. Never buy trees till you can attend to setting them out. Never buy trees that have been heeled in over winter. Frozen roots, unless frozen in contact with the earth, are no better than roots dried in the sun. Trees may be heeled in so as to have open spaces among the roots, and if frozen in this condition, they are worthless. Never buy trees of a dishonest man. What can be more vexatious than to purchase a supposed choice variety of fruit and plant it, cultivate it, prune it, and watch its progress till it blossoms and fruits, and then find you have been cheated? The fruit is not what it was recommended, and perhaps the tree has to be mutilated by regrafting. Nurserymen may be mistaken in the kind of fruit they sell, but a man that will *knowingly* palm off an inferior fruit for a good one, is guilty of the meanest kind of dishonesty.

"Another rule I would advise is, never to buy trees from a long distance.

"Agents are traveling the country getting orders for well known and large nurseries, and then supply their customers from any nursery where they can buy cheapest, and with any kind of fruit. Trees dug and packed for weeks, as is often the case in all large establishments, and unavoidably so through the press of business, the delays of transportation, &c., will not generally meet the expectation of the purchaser. It is therefore safer to buy trees near home, to go to the nursery and dig them, and see that they are set out again immediately. Do not buy trees that have been forced too much in the nursery. Trees that grow rapidly through cultivation or naturally, are not hardy, and will not do well under different treatment. Any tree that grows quick will decay quick. Do not buy trees that have been stunted in the nursery, any more than you woulc buy a stunted calf or pig. Trees that have been stunted are not worth receiving as a gift. Better pay a good price for good trees.

The next meeting will be held next Monday.

The Club adjourned.

H. MEIGS, *Secretary.*

February 13, 1860.

Mr. Lawton in the chair. Present 83 members.

The Secretary read the following translations and extracts from the works recently received by the Institute, from home and abroad, viz:

Bulletin Mensuel de la Société Impériale Zoologique de Acclimation. Paris, December, 1859.

Mons. L. De Brauze writes to the President, Drouin de L'Huys, last October, encouraging hopes of success in supplying Italy, France, &c., with healthy silk worm from China, and Mons. Guerin Meneville has presented to the society many specimens of silk, made in China, from the Alianthus, or Varnish tree of Japan, which is now acclimated in France. Some of these silks are especially remarkable for their brilliancy—nearly equal to that from mulberry, and the purity of its tissue.

SILKY WOOL.

Mons. Grant, of Mauchamp, has created a herd of silky fleece sheep, of very pure race, 600 in number. The wool is long, staple, smooth, silky, brilliant as cashmere. Some of the three year old rams weigh about 200 pounds. It is believed this silky race will equal in size the Merino race. Their flesh is deemed better eating: the fleece is not heavy, being about an average of *five pounds washed on the back.*

Mr. Grant has sold it this season for 16 francs a fleece ($3.20), which is more than that of the Merinos. It is clear to us, that this silky fleece will supplant the cashimere of Thibet, for us. It is as bright, and soft, and cheaper, and requires less skill to spin it.

Mr. Meigs referred to the proposition of the entomologist, Dr. Fitch, at the learned meeting, lately, at Yale College, to import ichneumonidæ to destroy our wheat insects; and the ichneumon family was a large one.

THE POTATO BUG.

There are four distinct flies of the cantharides family in this country that feed upon the potato.

PEACH-TREE DISEASES—A CURE FOR THE YELLOWS.

A. L. Smith, of Lebanon, Ct., made a statement about curing the yellows of peach trees, and introduced G. W. Andrus, of Newark, N. J., who has made the discovery, and proved it effectual. Mr. Andrus stated that his own trees were entirely healthy, while all around him the trees are dying with the yellows. He digs around the trees, and applies a cheap mineral substance; what it is he keeps as a secret, which has an immediate effect. A certificate from Mr. Hays states that he had Mr. Andrus apply his remedy to many very unhealthy trees, and it restored them to full health.

Wm. S. Carpenter objected to discussing a secret remedy to cure any agricultural difficulty.

Andrew S. Fuller moved that a committee be appointed to investigate this subject.

R. G. Pardee objected to committee, unless the discoverer will pledge himself to disclose the secret of his remedy.

Prof. Mason said that as no one could patent a discovery of a principle, this one may not be patentable, and therefore he is right in keeping his own secret. But large premiums have been offered for similar discoveries, and it may be worth while to investigate this subject, and see whether it is a humbug, or whether it is patentable.

Mr. Fuller, Prof. Mason, Mr. Pardee, Wm. S. Carpenter, and Mr. Doughty were appointed a committee to investigate the subject, and report.

John G. Bergen said that the disease called the yellows is not the only disease that affects peach trees, and prevents growing any good fruit. The insect that curls the leaves is worse than the yellows, on Long Island.

Prof. Mason.—If the thermometer falls 12° below zero for 24 hours the fruit will be destroyed.

Mr. Andrus stated that his remedy cures the curl of the leaf as well as the yellows; it makes the tree entirely healthy.

Wm. S. Carpenter said that he had raised peaches on a northern slope after a season that marked 18° below zero for 24 hours.

Prof. Mason stated that, in this State, where the thermometer sunk to 16° below zero last winter, there were no peaches.

Mr. Smith, of Connecticut, said that he always preferred the northern slope of a hill for a peach orchard. The disease called yellows always spread from one tree to another, as far as the blossoms are carried by the wind. He recommends cutting down a peach tree as soon as it shows the disease.

Mr. Henry recommends getting peach pits from healthy trees and healthy districts.

POP-CORN.

Mr. Carpenter recommends the rice corn as the best kind of pop-corn to grow in this vicinity. It is very prolific, and sells high. Each grain grows to a sharp point; its color is a yellowish white. There is quite a large demand for pop-corn in this market.

Mr. Cavanach, a horticulturalist of Brooklyn, read the following paper, prepared by him:

THE GRAPE.

Vitis vinifera of Linnæus, *Vitacea* of botanists.

The history of the vine is almost as old as that of man, for Noah had no sooner escaped the destruction by the flood, than he set about planting a vineyard, and making wine. The vine was once cultivated for the purpose of wine-making, in England, with almost as much success as in France; the Duke of Norfolk had, at Arundel castle, in Sussex, a vineyard, from which immense quantities of Burgundy was made; and the celebrated vineyard at Painshill, in Surrey, was noted for the excellence of its champagne. It was noticed by Miller and Langley, and particularly by Barry, in his history of wines. The extent to which the vine may be trained in a favorable climate is unknown; the two largest ever seen in England, were the vine grown against a house in North Hallerton, long since dead, which covered a space of 137 square yards; and that at Valentines, in Essex, about 147 square yards.

The celebrated Hampton-court vine covers the roof of a glass house, about 160 square yards. This vine was computed to produce 2,200 bunches of grapes. The vine at North Hallerton, when cut down, had a trunk of no less than four feet in circumference, near the ground. Pliny, the historian, mentions one that was 600 years old, in his time. Strabo, who lived in the reign of Augustus, says that the vines in Margiana, and other places, were so large that two men could scarcely compass them with their arms, and that they produced bunches of grapes a yard long. The preservation of leaves on vines, as, indeed, of all trees and plants, is of vast importance—in fact, so much so, that the removal of a single leaf tends to lessen the vigor and energies of it; much more must that be the case, when they are removed in numbers under the mistaken notion of admitting light to the fruit: and the still more barbarous custom of denuding the vines almost entirely, as some ignorant persons do, with a view to accelerate the ripening of the fruit.

Too much attention cannot be paid to the proper pruning of vines. There is a difference of opinion as to the right time to prune; but the general opinion, among persons of experience, is, that shortly after the fall of the leaf is the most proper time for pruning. In prating, 1st. Always cut upwards, and in a sloping direction. 2d. Always leave an inch of blank wood beyond the terminal bud, and cut on the opposite side of the bud. 3d. Prune so as to leave as few wounds as possible. 4th. In cutting out an old branch, prune it even with the parent limb. 5th. Never prune in frosty weather, or when frost is expected. 6th. Never prune in the months of March, April, or May. 7th. Use a pruning knife of the best description, and very sharp.

Dr. Underhill, of Croton Point, stated how vines are pruned in Europe. In Spain the vines are cut down within a foot of the ground, the old stump sending out enough new wood for fruit. In Germany the stump is left about four feet high. In Italy the vines are left twenty to forty feet long, and extending from tree to tree, always horizontal, some six or eight feet high; raising the fruit from spurs upon these main stems. The yield is very large, particularly where the soil is volcanic. In Spain a vineyard looks more like a cabbage-patch than like our vineyards. In this country we are cultivating grapes only 50 or 70 years from their native positions in American forests. These vines cannot be so closely pruned as the European vines, because they are stronger wood producers. If allowed to run, a strong growing vine would extend 50 or 60 feet; but I think the Isabella and Catawba vines should be limited to six or eight feet in length. The doctor contended against the idea that the Isabella vines are not perfectly healthy. He says that these vines are sometimes planted in too rich ground, and that produces too much sap wood, and then the fruit blasts. He acknowledged that there was a great deal of complaint of failure of Isabella vines to produce fruit, but thought the cause was all owing to bad management, and denounced all who assert that this is not the best of all sorts grown in this country.

About pruning, he said: I would prune from November to February. My vines are trained upon iron wires, on posts 15 or 20 feet apart; training six canes or branches from each root, for fruit, where the roots are strong. I would prune a city vine that climbs high, upon the short spur principle, two buds in a place. I pursue, in my vineyard, the renewed principle, growing wood this year for fruit next year. These wood-growing branches bear no fruit this year, and those which are bearing are all cut away, from which new shoots for wood are trained for next year. My soil is deep sand, and I have used clay and much for fertilizers. I have trenched deep, but have not underdrained. The rose, or June-bug troubles us. We find a benefit in plowing in November, to destroy these insects; but we have to go through the vineyard and catch the bugs in a cup of water. We go over the vines for eight or ten days, when the bugs are very plenty, twice a day. Plowing late in the fall seems to destroy the seed of these bugs. They are worse on southern slopes than on northern ones Their depredations are upon the blossoms, which they will soon destroy if the bugs are not themselves destroyed. The morning is the best time to hunt them, for then they do not fly. The black spot on grapes is produced by the bite of the rose-bug upon the young grapes. The most, and almost the only, successful vineyards in the northern United States, are of the Catawba and Isabella varieties. The Scuppernong grows naturally at the south, and is a very large and productive vine. The fruit makes a light wine, that needs a good deal of brandy to keep it. The Diana lacks two characteristics to make it sell well in this market: it is too small in in fruit and bunches. The Rebecca is a white grape that will sell as a white grape. The Hartford Prolific is a coarse grape, large berry and bunch, and will answer where the Isabella will not. So will the Concord. The Delaware is a sweet, rich grape, and good for private use; but none of these grapes will supersede the Isabella and Catawba as a market fruit, or for large vineyards. It is a slow grower, and the fruit of small size. I have planted many kinds of foreign vines, and dug them all up as unprofitable. Every one has, and will prove a failure, and many thousands of dollars have been lost by the experiments, and probably will be again. Foreign vines will not succeed for out-door culture.

GARDENING INQUIRIES FROM WISCONSIN.

Solon Robinson read a letter from M. Lamb, of Onalaska, LaCross county, Wis., making a variety of inquiries how to improve a sandy garden soil, situated near the Mississippi, below the Bluffs, and some sixty or eighty feet above high water. Wells have to be dug seventy or eighty feet through sand; the natural growth is black oak, growing sparsely. His garden, of half an acre, is on a sandy ridge, and has borne two crops, with a dressing, last spring, of about a cord of good manure and a wagon-box full of lime and ashes, with the following results:

My crops were as follows: Evergreen sweet corn, very good; mountain

June potatoes, very poor; sweet potatoes, middling; melons, cucumbers, squashes, good, but not equal to Rhode Island sweet pumpkins; last year, tomatoes, Lima beans, beets, turnips, salsify, all good; rhubarb and onions, poor.

As we have no apples in this vicinity, we are obliged to depend upon vegetables for pies and sauce. I had three vines of the Japan apple melon, which, after shortening in a great deal, covered a space of four square rods, and produced eight or ten small melons, the largest of which did not exceed ten pounds in weight. Of some eight or ten kinds of tomatoes raised, I prefer the large yellow variety; it is a great bearer. I have raised the purple fig tomato (which, by-the-by, is not a very appropriate name for it, as it does not resemble the tomato in the least); also, what we call the Globe (another inappropriate name); the fruit of this is about the size of a hen's egg, and only slightly tinged with purple, and much more acid than the fig tomato. Also, two kinds of ground cherries which come up from the root, all over my garden, early in the spring. The fruit is about the size of a cherry, and quite acid, though pleasant to the taste. Early frosts have no effect on this plant, but with me they are nearly all destroyed by worms and blight. Is there any way to prevent it? The other kind is an annual, and bears profusely—fruit not very acid, and falls off when ripe. This plant is very tender, and sensitive to the frost. The fruit of both kinds is encased in a husk. Currants, gooseberries, and raspberries do well, but fruit trees are a failure. The trees shrivel and dry up at the first cold weather in autumn. How can I prevent them?

Grape vines, with me, are a failure. I cannot get them to grow. I have one two years old, which is almost fifteen inches high! I raised several from layers last year, which grew to the hight of six inches, or less! I have a bed of strawberries containing plants of six varieties: Honey Seedling, Burr's New Pine, Moyamensing, Early Scarlet, Monroe Scarlet, and Hooker's Black, all mixed together. They were set out in the spring of 1858, but nearly froze out the following winter, and did not fruit last summer, but grew finely.

The questions which I wish to ask are these:

1st. What kind of manure is best adapted to the soil described? (I have thought of planting potatoes in drills, very deep, and covering first lightly with soil, then with coarse stable manure, then with soil.)

2d. How shall I raise rhubarb on such dry sand?

3d. Is there not some more appropriate name for the Fig tomato and Globe?

4th. Can I prevent the ravages of the worm in the perennial ground cherry?

5th. Can I guard my young fruit trees from winter, or rather autumn, killing?

6th. Can I expect any fruit from my bed of mixed strawberry plants?

7th. What shall I do with my grape vines?

8th. How shall I destroy the gopher mole that sometimes makes sad work with my vegetables?

The thermometer ranges here from 100 degrees above zero in the summer season, to 40 degrees below zero in winter. January 1, 1860, it was 32 degrees below. We have not had over two inches of snow this winter, and now the ground is bare.

Mr. Smith.—His strawberry bed must be covered in winter in such a cold climate as that.

Mr. Carpenter.—Let him use ashes if he cannot get muck; also leaf mold and woods earth.

Mr. Pardee.—The best manure would be clay, muck, peat, leaf mold or ashes. By adding these he can raise rhubarb. Such a mixture as he speaks of, in a strawberry bed, will not produce well, and will soon run out. The kinds should be kept separate. Leaf mold, ashes, bones, old leather, and more clay is needed with the sand to grow grape vines.

Solon Robinson.—I have no doubt clay would be a valuable addition to that soil. He can, doubtless, grow potatoes in the way suggested, but I would put the coarse manure on the surface to act as a mulch. There is no better mode of guarding the fruit trees from the injury spoken of than mulching. Before you destroy the gopher mole, ascertain what it lives upon. Perhaps it does more good than harm, by destroying noxious insects.

Mr. Fuller suggested that the best name for the tomatoes mentioned was the botanical one.

The next meeting will be on Monday, Feb. 26, and the subject of grape culture, spring planting, flower culture, &c., will be continued.

The Club adjourned.

H. MEIGS, *Secretary.*

February 20, 1860.

Mr. R. L. Pell in the chair. Present 68 members.

The Secretary read the following translations and extracts, made by him since the last meeting of the Club, from the articles "Foreign and Home," received by the institute, viz:

[Bulletin Mensuel De La Societe Imperiale, Zoologique D'Acclimatation. Paris, Dec. 1859.]

The President, Drouyn de L'Huys, presents a letter from the general agent of the Society, relative to the Santa Martha potato, referred to the 5th section.

Mr. David, relative to the Australian potato, grown successfuly at Cerny, near the Ferte-Alais, (on the Seine and Oise) 60 tubers raised from *one.*

Mons. Chalet, relative to a Siberian potato; results favorable.

Mons. Lucy, as to the culture of the Bamboo, from the mountains north of China, now with success at the mouths of the Rhone.

Mons. Chaget, Sen., presented beans from Senegal, having pods over two feet long. The bean is much valued by the Chinese.

Mons. Fontainer, of the Shanghai Consulate, presents a very large tuber of the Su-tchuen—a sort of Truffle.

Mons. Jacqueminot exhibits Ignamer, (Chinese yams) already shortened considérably in culture.

Pisciculture ably done at the Buisse, on the Ireve, by Pierre Tartar, under Count de Galbert.

The red and gray partridges, pheasants and moor-hens, of California, are successfully raised at Mulhouse, by Mons. Haffely.

[Journal de la Societe Imperiale et Centrale D'Horticulture. Paris, December, 1859. NAPOLEON 3d, Protecteur.]

The President, Mons. Payen, remarked that it is certain that frauds are sometimes committed in Egypt upon strangers, and in the seaports, where every day wheat is sold as *mummy wheat*. The varieties of wheat are grown from them. As to the grain actually found in the mummy cases, we have never known it to germinate, and its great antiquity and the effect of the bituminous material about it destroys all germinating power. But we must take care not to confound such grain with that which, by accident, may have been buried so deep as to be out of the reach of oxygen, without the presence of which the grain cannot germinate.

DISEASED CELERY.

Last year a disastrous malady raged among our celery. This year it is extending, and immense losses are known, particularly near Liancourt, on the meadow lands very suitable to the celery. It is difficult for me to describe the disease; but first, black spots come on the leaves, increase rapidly, and in eight days the whole plant becomes scorched so as to break all to pieces on the least touch. In appearance, it is similar to the potato disease when that is at the worst. It has appeared near Paris, and engages much attention.

The *rose colored* Malaga potato, three sorts, is approved much better than our yellow one.

The Swiss onion is an excellent variety; much grown at *Roannes*.

DIOSCOREA BATATA, OR IGNAME.

South America has this precious plant. There are many species of it in Venezuela. It is indigineous in America, as well as in Africa and China; is found wild in the virgin forests of America. The Spanish name is *Name*. Three sorts are cultivated: the *Name de St. Domingo*, the *Name liso*, and the *Name de espina*. The St. Domingo, like the rest, is a vine; has small bulbs on the foot stalk of the leaf and the root bulb. They let the vine grow on trellis.

The *Name liso*—its tuber is longer; opal white; fleshy; milky juice; yellowish brown skin; roots run down deep. The *Name de espina*, the thorny one; the little, rootlets, are thorny; the flesh fat, marrowy, succulent; its vine grows several yards high. Some of the Venezuelan ignames grow roots weighing over 200 pounds; they are very nutricious, and easy of digestion. *It is the Yam!*

MAPNEY

Grows like the igname—one kind white, another violet color; the latter good eating.

OCUMO

Is another farinaceous root; it is an *Arum esculentum*, and belongs to the family of the Aroides; the tubers about 6 inches long and 1½ inches diameter. Its starch very white and wholesome.

The plants flourish in a temperature of 22 degrees Centigrade, to about 73 degrees Fahrenheit, but do not like it below about 60 degrees Fahrenheit.

The *Wampi* (*Coockia punctata*), a fruit relished by the Chinese, would do well in France, we believe.

THE FRENCH PLANTATION IN ALGERIA.

Since the foundation of our colony in Algeria, we have sent them 1,146,589 trees—economic, fruit, forest and exotic; 41,722 shrubs and bushes; 925,386 young trees, and 2,116,211 plants of herbaceous character, besides seeds, tubers, &c., &c., of all sorts. Our mulberry and silk-worm do not succeed there as we hoped; yet one province gave us in one year, 1857, over 3,000,000 pounds of cocoons; but in the last, only the sixth part of it.

OLIVES.

74 varieties. Castor oil plant, 14 varieties.

RUSSIA: ST. PETERSBURGH.

[New Horticultural Society under the Presidency of his Imperial Highness, the Grand Duke NICHOLAS.]

We have received a copy of their statutes, and we are happy to inscribe that society on our list of Corresponding Societies. The American Institute did the same, and sent the volume some time ago.

PHOTOGRAPHY FOR FARMERS.

Mr. Bruce recommended the use of photography for farmers, to take the likenesses of a great many of the destructive insects that infest our farms and destroy our crops.

GREEN SAND MARL, (of New Jersey.)

Of vegetable origin and agricultural value. By Benj. Aycrigg, *of Passaic, N. J.*

Gentlemen of the Institute: I submit to your consideration the following tabular statement. (Silex, clay, iron, manganese and chlorine are excluded in all the following :)

	Squankum, Monmouth county, N.J. Beautiful green; free from shells; very little sand; slightly arid.	Pemberton, Burlington Co. Dark green; no shells; not arid.	Clementon, Camden county. Dark green; nearly pure marl grains; not arid.	Freehold, Monmouth county. Rich olive green; almost pure marl grains; decidedly arid.	New Egypt, Ocean county. Mostly clear, green sa:d, but contains a few reddish colored shells; not arid.	Pemberton, Burlington Co. Fine green; clean; not arid.	Blackwoodtown, Camden Co. No shells; small crystals of plaster; not arid.	Mullica Hill, Gloucester county. Good specimen; not arid.	Woodstown, Salem county. Yellowish green; coarse; clean; not very good average.	Mean of the above nine analysis, from page 85 to page 99, Geological Survey of New Jersey, 1855, reduced to percentage of the six most important constituents.	Mean of eleven kinds of seaweeds, from page 403, Johnson's Agricultural Chemistry, reduced to percentage of the same, six most important constituents.
Lime	23.5	14.8	16.5	3.5	17.0	8.2	15.1	16.6	8.4	13.8	11.2
Magnesia	13.8	9.2	13.4	27.6	18.7	28.3	17.8	17.8	14.6	17.9	11.1
Potash }	29.0	52.8	44.5	51.0	38.6	46.5	0	39.2	54.9	44.0	19.7
Soda }										44.1	24.4
Phosphoric arid	30.8	15.1	21.9	7.5	10.6	16.1	23.3	20.7	21.2	18.6	5.8
Sulphuric arid	2.9	8.6	3.7	10.4	15.1	0.9	4.0	5.7	0.9	5.7	27.8
	100.0	100.00	100.0	100.00	100.0	100.00	100.0	100.0	100,0	100.00	100.00
Percentage of the mass	14.75	11.09	12.05	13.73	14.99	14.87	15.67	17.35	12.47	14.11	97.7
Gross weight of equal worth	6.62	8.81	8.11	7.12	6.51	6.57	6.23	5.63	7.84	7.05	1.0
Cost of barilla, (in the marl,) per 2,000 lbs.. (when marl costs ten cents per bushel.)	$16 95	$22 54	$20 75	$18 21	$16 70	$16 81	$15 95	$14 41	$20 05	$18 04	$45 00

Part of this table may require explanation. 1st. ("Silex, clay, iron, manganese, are excluded in all the following.") There being heavy beds of sand and clay, mixed with much iron, associated with these marl beds, we have no means of judging how much of each of these ingredients is adventitious. The quantity of manganese is not given in the analysis, the object being to compare this marl with the inorganic constituents of vegetables. Those substances, together with the water, were excluded from the analysis, and the remaining constituents, (viz: lime, magnesia, potash, soda, phosphoric acid, and sulphuric acid,) were reduced to percentages, as if these constituted the whole mass.

2d. These six ingredients are separately given for the nine specimens, of which the analysis are reported in the geological survey of the State of New Jersey, 1856, pp. 85 to 89.

3d. The tenth column gives the mean of the nine specimens.

4th. The eleventh column gives the mean results of the analysis of eleven kinds of seaweed, from Johnson's Agricultural Chemistry, 2d edition, Edinburgh, 1847, page 403. These are reported in a different form from the analysis of marl; they were, therefore, first reduced by chemical equivalents to the same terms; then the same materials excluded as in the case of the marls, and the remainder divided into percentages, as if they constituted the entire mass.

5th. The line marked "percentage of the mass," 14.75 for the Squankum marl, and 14.11 for the mean, and 97.7 for the ash of seaweed, shows the percentage of the whole specimen produced by the six specified ingredients.

6th. The line marked "gross weight of equal worth," 6.62 for the first, 7.05 for the mean, and 1.00 for the seaweed, shows how many pounds of the first, or of the mean, are equal in worth to one of the ashes of séaweed (barilla;) or how many tons of the particular marl we must transport, or apply to the land, to equal one ton of barilla.

7th. The line "cost of barilla, per 2,000 lbs., when marl costs ten cents per bushel," $16.95 for the first, $18.04 for the mean, shows the price we pay for 2,000 lbs. of kelp, or barilla, contained in the marl, when marl costs ten cents per bushel. The present cost of barilla itself is $45 per ton. The price, ten cents per bushel, was adopted as the cost to myself at the dock, (seven cents for the marl, and three cents freight;) but it will answer for any other rate per bushel by a very short calculation. Thus Dowing, 1848, p. 404, says that "marl is sold at the pits near Burlington at twenty-five cents per load, and delivered from sloops at seventy-five cents per ton." (Ton is twenty-five bushels of eighty lbs.) The first rate being one cent, they can afford to pay but one-tenth of the price stated for a ton of barilla, or $1.77, as compared with the mean of the marls at the pits; or at the dock, three cents, they can pay $17.73x3-10—$5.3-19 per ton for barilla, to have the same value of useful ingredients, as for the same money expended in marl.

8th. In addition to the columns in the table, I made part of a calculation to ascertain the expense at which we might artificially combine the ingredients; but taking lime at ten cents per bushel, unslacked, salt at $4.50 per ton, and plaster at $6 per ton, we get all the ingredients, except potash and phosphoric arid, for $2.29, weighing 1,218 lbs. This leaves but twenty-one cents to equal the expense of marl. It would cost much more to collect these materials. Hence we have this excess, together with all the potash and phosphoric arid, as clear gain in using marl. It was, therefore, useless to continue the calculation.

These amounts are not conclusive even with the assumption that the compounds are of equal value. In the marl we have a natural compost easily worked; and at a given short distance from the pits it will cost less to haul the loam mixed with the inorganics, than to mix loam artificially with pulverized barilla; but in my case, where the freight on loam costs three cents per bushel, it requires a calculation of the expense of manipulation to prepare the barilla for the land, together with the expense of procuring the barilla, before a fair comparison of expense can be made.

We must not, however, carry theory (or established truth) beyond its proper bounds, and assert the value of these ingredients to be the same in the form of marl, as in some other form where their worth has been established. Glass bottles, trap rock, and granite, contain valuable fertilizing substances; but in these forms they are nearly or totally inert, because insoluble. So may it be in part with marl. From the remarks quoted at the end of this article, we may infer that the "seasoning" may be a process similar to the *formation* of granite; or that the silex having remained in a soluble form, as long as wet, becomes fixed on being dried, and cannot be re-dissolved either by water or arids, as in the case of chemical analysis, where the silica is separated in this manner. Thus the alkalis, although present in marl, as shown by the chemist, with the aid of extra alkalis, strong heat and strong acids may still be there, as in the case of glass, granite and trap rock, in the form of insoluble silicates, especially since marl contains a large excess of silex. How far it is chemically combined is not stated; this requires testing. If the potash can be easily extracted, this marl would supply the world with alkali for soap, gunpowder, &c.

The comparison of these analysis of the green sand marl, with those of the ashes of sea weed, appears to me to show conclusively that the marl is of vegetable origin. It is not only composed exclusively of the same materials as the inorganic constituents of plants, but it contains them all. Even the proportions bear a striking resemblance to the ashes of the sea weed, differing materially from upland vegetation. The presence of shells in all these marls adds to the presumption that they are of marine, and not like coal, of fresh water origin, since some of the shells resemble those at present in the ocean. Lime, in some specimens, is less than in barilla; in some more; the mean is a little more. The same is the case with the magnesia, the alkalies forming 44 per cent, are identical. Phosphoric acid in marl is in excess 3 to 1, (from the bones of fish!) Sulphuric acid deficient 1 to 5, (washed out!)

No one disputes the self evident fact, that this marl is valuable as a fertilizer, since it has converted "Sandy Monmouth," once resembling the southern portion of Long Island, into a garden; but its comparative value is an unsettled question, since it is at times maintained in the Farmers' Club, that the value of these substances that resemble those contained in plants, is affected very materially by the fact of their having at one time formed parts of plants; the geological examination of the subject is not inappropriate to the purposes of the Farmers' Club, if we can thence deduce additional reasons for concluding that the green sand marl is of vegetable origin.

These marl beds, in their position, very much resemble coal beds. They are three in number. They are nearly parallel planes, differing S. E., at the rate of about 30 feet per mile. The "strike," or range along the level, of two of them, is found to be 356 W. from Red Bank, on Shrewsbury river, near Sandy Hook, diagonally and nearly in a straight line across the entire State of New Jersey, and crossing the Delaware river into the State of Delaware. For the lower 60 miles (or from opposite Bordentown to the Delaware river,) it is nearly parallel with the river, passing about 7 miles S. E. of Philadelphia, at the water level of the lowest or most northwesterly of the beds. Hence, the presumption, that the same geological cause gives the position of that part of the Delaware, and of the marl beds.

The southern line of the red sand stone runs from "near Elizabethport, to the Delaware river, a little below Trenton," (page 55 Geol. Ref. 1856). The whole State south of this line "is remarkable for its low and generally level surface, and for its entire lack of rock formation. Its geological structure, however, is very regular and uniform. With some exceptions, it is made up of successive strata, which stretch across the State from northeast towards the southwest, and descend beneath the surface towards the southeast, so that, as we pass from the north, or division line across the State in a southeasterly direction, the strata are crossed in succession; the lowest first, then the next above, and so on in order to the highest." [The highest, or last deposited, being at the sea coast]. "In this way the light-colored clays, including the fire and potter's clays, are first crossed; then the black and chocolate-colored, astringent clays; then the several beds of green sand-marl, with intermediate beds of sand; and lastly, the more recent beds of shell-marl, sand, clay and gravel, which make up the southeastern part of the State." (p. 56).

The first bed of green sand is 25 feet thick. Above this, and between first and second marl bed, is a ferruginous sand bed of 110 feet. The second bed exceeds 15 feet, but its thickness is not well ascertained. Sand bed above second marl bed 40 feet. Third, or highest, or most southerly marl bed, from 8 to 10 feet. There are other layers of clay and shells, &c. (pp. 61 to 65).

These marl beds resemble coal beds, not only in their form, but in the materials, as being exclusively those found in vegetables. But they differ very widely in the character of the materials. The coal contains the entire substance of the plants, and the inorganics form but a small percentage; while the vegetable portion, or the carbon, constitutes nearly the entire mass. Marl, on the other hand, resembles the ashes of plants, and most nearly that of seaweed. The ashes of wood give from ½ to 2 per cent of the weight of the wood. Grasses give from 6 to 9½ per cent of ash. Seaweed, as in the table, gives 16.46, and mean of 5 other kinds mentioned by Johnston, 16.60 per cent. Supposing the marl to be the inorganics of plants, then the lowest bed would result from a mass of vegetable in the form of coal.

If of wood,	at least,	25x50,	or 1,250	feet thick.
do grasses,	do	25x10½,	262	do
do seaweed,	do	25x6	150	do

It is also stated that it requires about 24 tons of seaweed to make one ton of kelp.

1st. These marl beds might, possibly, be beds of marine manure, deposited by animals feeding on seaweed. But their extent makes it improbable.

2d. They may be the remains of immense beds of weed thrown upon the shore by the gulf stream, when the lower part of Jersey and large sections of similar land in the southern states were under water, and the coast line was in the neighborhood of Staten Island and Philadelphia. The immense amount of seaweed collected in the midst of the Atlantic, within the tropics, would, probably, be sufficient to produce these results.

3d. There are facts stated in the report that show, conclusively, that in the southern portion of this State, at a "comparatively recent period, the ground has been several feet lower than it now is; that it has been elevated to a hight several feet above that at which it is now; and that it is now, and has been for a long time past, sinking slowly." (p. 84).

This alternate rising and falling of the lower part of Jersey appears to me the most natural way in which this weed could have been collected with so little mixture of sand, at the time that this portion of the State formed the delta of the Delaware and Hudson rivers. Suppose the existence of bays similar in character, but greater in extent than those that skirt the Atlantic coast from the eastern end of Long Island to the straits of Florida, the barrier keeping off the waves of the Atlantic, would allow the weed to accumulate and rot on the bottom.* The first bed having been thus collected, rotted down, and the vegetable portion carried off, a settlement of the coast barrier would let in the sea, with its waves to cover up the first bed of marl, with the sea sand 110 feet deep. This repeated, would account for all the facts.

If the hypothesis that I have stated be the true origin of this marl, then the same cause may have produced the same effect on any part of the similarly situated coast of the United States. This marl is known to cross the Delaware river into the State of Delaware, at St. Georges. May it

*At Islip, on Long Island, they rent out the strand at the rate of $1.75 per rod per year, for the privilege of collecting the seaweed as manure.

not be found much farther south; detached, perhaps, but still existing in large quantities?

On the other hand, may it not underlie the sands of the south part of Long Island, and may not a little investigation show that it crops out towards the middle, or some other position on the island? If this should be so, and the same use be made of it as in this State, we may find, as here, land raised in value from $10 to $160 per acre.

Whatever may be thought of the manner in which the seaweed has been collected, I think that the analysis in the table furnish sufficient evidence that green sand-marl is the result of vegetation, and consequently, that it may, hypothetically, be raised to the grade of those inorganics that have once been in an organized condition.

In conclusion, I think that the charge of 7 cents per bushel, or $1.75 per ton, is enormous, when we see the large mass of marl cropping out at Sandy Hook, and so easily obtained, when compared with the expense of mining coal. Moreover, it is probable that the marl which we get in this neighborhood, brought from the high, dry banks of the Navisink hills, is not as valuable as some of the others, since the report, pages 93 and 94 says: "Some of them are more soluble than others. Those which are dug in valleys, or in locations where the surface water does not soak through them and run off below; where they have never been drained and dry, are always the easiest dissolved, being readily decomposed by carbonic acid and water. Many of the *dry bank* or *hill* marls appear to have undergone a kind of seasoning, such as stone goes through when taken from the quarry and exposed to the weather — they become harder and less easily acted on. The experience of the farmers with the active marls, lends support to this view; in that, they find the heavy dressings applied at long intervals, as was formerly the practice, are not as beneficial as the same amount applied in lighter and more frequent coats. When first taken from the pit it is most active and gradually becomes inert. Lime mixed with such marls, or applied on them in the soil, will render them more easy of decomposition, and thus favor their action."

Mr. Pardee said that the point upon which we want information, is, where to apply this fertilizer, since, in some cases, it has not proved a valuable application. He stated a case, corroborated by the chairman, of its application by Samuel Stevens, late of Long Island, where the land was injured rather than benefited.

FLOWER CULTURE BY A FARMER'S WIFE.

Solon Robinson read the following letter, from Mrs. C. J. Penoyer, of Sharon, Dutchess county, and commended it to the attention of other farmer's wives, particularly that portion of it which speaks of saving seeds. It is from that that all improvements must come.

"I have read with much interest the discussion at the Farmers' Club, and being a great lover of flowers, I have found some hints which I consider of so much importance, I have cut them out and given them a place in my scrap book. Being a farmer's wife, and loving out-door employment, I have superintended the garden, and have taken especial pains to save the earliest seed, from the largest and best vegetables which we raise. For some five or six years past I have saved my whitewash, after house-cleaning, and used it to sprinkle on the vines to expel the bugs, and have always found it effectual; being careful not to use it too strong. And for potato vines, I have no difficulty in expelling the bugs, by sowing on ashes, when the dew is on, or after a rain. Two or three applications have to be used generally. I wish to make some inquiry, if it would not be inconvenient to mention it at some subsequent meeting; I would like to see it discussed.

"I, last fall, purchased a camelia; I kept it in my sitting room, the buds grew finely, the upper bud had began to expand, and just as I thought I should have a splendid flower, it blasted. I then removed it to a room where the air was less heated, and two other buds began to open finely, but before they had half expanded, they seemed to have remained stationary, and now they are closing up. Could any one show the cause and a remedy, I should be highly gratified."

Mr. Pardee stated that it was almost impossible to grow camelias in the dry atmosphere of our stove-heated rooms. The same result follows almost all the attempts to grow camelias in warm rooms.

Mr. Cavenach.—If the lady will keep her camelia in a room where the temperature is pretty evenly in the neighborhood of forty degs., she will be able to get perfect flowers.

A FARM PUMP.

J. D. West exhibited and explained the construction of his anti-freezing iron pump. In ordinary farm pumps the chamber of the pumps is placed below the platform. The house, or cistern pump, is prevented from freezing by an air chamber, that surrounds the chamber in which the valves work. He also took the pump apart, and explained its construction, which gave great satisfaction to the audience. He also explained how, by attaching a hose to the nozzle, it operates as a small fire engine.

Mr. Harrold stated that he had one of the pumps, and 70 feet of hose, through which he can throw water with great ease.

Mr. Doughty, of New Jersey.—I have one of these pumps, and I take out a little pine plug in the fall, that lets the water that is above the platform fall back, and it never troubles me in the least about freezing.

INSECTS ON FRUIT TREES.

Mr. Smith, of Lebanon, Ct., stated that he was well satisfied, that a man of Massachusetts, has invented a remedy for all insects that climb trees. The trees are encircled with an iron trough filled with salt bitterns water, that catches and kills all that gets into it. The iron troughs cost from 50 cents to $1.50 each.

John Harrold stated that this plan will not cure the curculio, as that is a flying insect; and it is becoming more and more destructive, not only to plums, but pears, peaches, &c. He mentioned a case of two plum trees, that grew fruit perfectly until a bolt of forest-trees that sheltered them was cut down, and then the curculio attacked these trees and has since destroyed all the fruit.

Wm. S. Carpenter.—A neighbor of mine practices building fires through his orchard during the month of May, which he thinks destroys a great many insects.

The Chairman said that he had tried the plan of building fires, without any benefit.

GYPSUM.

Mr. Pell.—The mineralogical name of which is plaster of Paris, and the chemical name sulphate of lime, from the fact that it is composed of sulphuric acid and lime. Both of these important substances, particularly the former, are sometimes deficient in soils, when the application of gypsum is attended with a very happy effect, being found to exert an influence peculiarly favorable on all leguminous plants, such as peas, clover, &c., towards which it acts as a powerful invigorator, and will always be found indispensable in soils deficient in lime and sulphuric acid.

It possesses another exceedingly valuable property, that of fixing ammoniacal gases. When the carbonate of ammonia comes in contact with sulphate of lime carbonate of lime and sulphate of ammonia are immediately formed. Sulphate of ammonia is a permanate salt; the ammonia becomes fixed; and, consequently, protected from injury by volatility. Carbonate of ammonia rises from our manure heaps in large quantities; besides which, it exists naturally in the atmosphere.

When our soils are found to contain lime, we may form gypsum in them, by adding sulphate of soda, or dilute sulphuric acid. If the former is made use of, it leaves the soda in a very short time, and becomes gypsum.

This substance is a crystaline compound, and occurs as a mineral deposit in various parts of the world.

According to Köllner, the action of gypsum depends upon the power possessed by lime, to form with the oxygen and carbon of the atmosphere compounds, which are favorable to vegetation. According to Ruckert it acts like any other food; according to Mayer it merely improves the physical properties of the soil; while, according to Riel, it is an essential constituent of the plant. Hedwig called gypsum the saliva and gastric juice of plants. Humbolt and Albert Thaer considered it as a stimulant, by which the circulation of plants is promoted; and Chaptal ascribed its action to a supposed power of supplying water and carbonic acid to plants. Davy regarded it as an essential constituent of plants, while other English agriculturists have supposed it to promote fermentation in the soil. Lanbender says it acts as an exciting power, without mixing itself with the sap of the plant. According to Liebig it fixes the ammonia of the atmosphere; and if Sprengle and Braconnot are right in their surmises, it supplies sulphur for the formation of the legumin of leguminous plants.

Der Pflanzen says that gypsum consists of the oil of vitrol and quick lime; and that, when it acts upon carbonate of ammonia, in a moist state, the two acids change places—the sulphuric acid preferring the ammonia, the carbonic acid the lime. It is not only present in many soils, but is also found in springs which ascend from rocky localities, and in numerous plants. It is extensively employed for the purposes of promoting the growth of vegetable productions. Naturally it contains more than twenty per cent of water, which it loses on being exposed to fire-heat, and is reduced at once to an impalpable powder; but if exposed to moisture immediately combines with twenty per cent of water, and by a small additional quantity may be poured into a mould, where it becomes a solid mass in a few moments. In this manner burned plaster is employed in the manufacture of cornices, busts, &c. Burned gypsum consists of sulphuric acid and lime only, in the proportions of 58¾ of the former, and 44¼ of the latter. Pure gypsum contains:

Sulphuric acid	43	parts.
Lime	33	do
Water	24	do
	100	

In this State there are only four cultivated plants that contain it in sensible proportions, and to which four only it forms a direct food, to wit: clover, rye, grass, sainfoin and lucern; and, consequently, it will always be found an admirable top-dressing for these. By analysis wheat, barley, peas, beans and oats do not contain a trace of it; consequently it is not worth while to waste it upon these crops. It has been supposed to possess imaginary powers of absorbing moisture largely from the atmosphere.

I imagined this to be the case, until, by the following experiment, my error was discovered. I dried five hundred parts of plaster, and then exposed it four hours in a foggy atmosphere, when it only gained four parts in weight; while at the same time a portion of good soil, dried and exposed along side of it, absorbed 15 parts, a sample of soot 40 parts, and stable litter 150 parts. Placed in the manure heap it retards putrifaction and rapid decomposition.

The time selected to spread plaster has a very material influence upon its usefulness. Its effects are rarely apparent when sown in dry weather. The season should be moist, and the leaves of the grasses wet, when the advantage will be immediate. Two hundred pounds to the acre will be generally found sufficient to produce a maximum benefit. If the result is not favorable, and the land good, you may make up your mind that the soil naturally contains a sufficient quantity of this salt, and that something else is required.

I once had a field that formerly produced splendid crops of red clover, refuse to grow it more than six inches high, and exceedingly sparce at that. Farm-yard manure was spread upon it at the rate of thirty loads to the acre, without adding to its luxuriance. Other enriching substances were placed upon it, still without effect. I analyzed the sub and surface soil, and found it absolutely deficient in sulphate of lime, and immediately sowed two hundred pounds to the acre, and produced a luxuriant and remunerating crop.

If we sow 100 pounds of gypsum on our land, and it comes in contact with a sufficient amount of ammonia, it will fix sulphate with 22 pounds of ammonia, containing 17 pounds of nitrogen. I top-dressed an acre of clover with 320 pounds of gypsum, and the excess produced over a contiguous acre was fully equal to forty per cent. And the effect, so far from passing away with the crop, extended its beneficial action for four years; showing that it exercises some influence over vegetation that is not altogether understood. On the acre in question, the increased production, the first year, was as above stated, 40 per cent. The second year 30 per cent; the third year 20 per cent, and the fourth year 10 per cent, when the adjoining piece was nearly run out.

In this experiment may be found the explanation why plaster has become unpopular with agriculturalists, and its beneficial action deprecated. Finding wonderful results produced by its use the first year, they used a double quantity the next, which caused their land to become plaster sick, and incapable of yielding remunerating crops. One thousand pounds of dry hay, if analyzed, would not contain more than three pounds of sulphuric acid.

1,000	pounds	of red clover,	4	pounds.
1,000	do	of white do	3½	do
1,000	do	of lucern,	4½	do

You will sometimes find a soil of uniform depth, where the surface, in composition, is similar to the sub-soil; when this is the case, it may be considered nearly inexhaustible for some plants, such as carrots, parsnips, hemp, &c. But not for the clovers and leguminous plants until gypsum is applied, when they will grow in unsurpassed luxuriance.

Still, by the application of gypsum to such a soil, I once rendered it completely barren, analysed it, and discovered that it contained oxide of iron, with which the sulphuric acid combined and formed green vitriol, or sulphate, or iron, which poisoned the roots of all the plants coming in contact with it.

It is indispensable that a fertile soil should contain every substance that the plant, we intend to grow in it, obtains only from the earth, in sufficient quantities to supply all its requirements, while, at the same time, it must be devoid of all poisonous matters. The effects of gypsum in Prussia, a few countries in England, and many portions of the United States, is truly amazing, while in other portions the benefit has never repaid the expense of applying it. Lampadius remarks, that it may with certainty be stated, that by the use of gypsum, the produce of clover and the consequent amount of live stock have been increased, at least one-third, in Germany.

It is beyond contradiction, that the use of gypsum produces a largely increased growth of clover and grass on certain soils, which must be determined by experiment, that should be made on every farm. As far as research has gone, its action appears to be altogether chemical. The farmers in the vicinity of Lyons, in France, use dilute oil of vitriol, 40 pounds to 200 gallons of water, on their clovers, instead of plaster, and produce precisely the same effect as attends its use.

Dr. Home, of Edinburgh, in 1756, observed that sulphate of soda produced a remarkable effect upon several of the grasses, which fact has been lost sight of by practical agriculturalists. It also contains sulphuric acid, and may possibly succeed, where plaster fails. In many parts of our country gypsum is the universal fertilizer for grass, corn and root crops. Franklin wrote on its effects, and, I think, practically demonstrated them.

Among the most bitter enemies of the use of gypsum were the proprietors of salt pans, who declared that it was absolutely incompetent to replace schlot, or the refuse of their pans, as an enricher; but it has since turned out that schlot is neither more nor less than sulphate of lime. Experience has, however, taught us that gypsum alone is inadequate to cause fertility without the concurrence of organic manures, and that it produces its best effects upon sainfoin, lucern, and clover. I have found it perfectly useless on natural grasses; of doubtful advantage on turnips and potatoes; of no use on cereal grains, and perfectly null on low, damp grounds. The French government ordered M. Bose to make a particular enquiry on the subject of its use in agriculture, and he asked practical men the following series of questions:

1st. Does plaster act favorably on artificial meadows? Of 43 opinions given, 40 are in the affirmative, 3 in the negative.

2d. Does it act favorably on artificial meadows, the soil of which is very damp? Unanimously, no.

3d. Will it supply the place of organic manure, or of vegetable mould? Unanimously, no,

4th. Will a barren soil be converted into a fertile one by the use of plaster? Unanimously, no.

5th. Does gypsing sensibly increase the crops of the cereals? Of 32 opinions given, 30 were negative, 2 affirmative.

In the above single lines from practical men, a summary of, perhaps, forty years experience may be found.

Professor Liebig says that a single pound of plaster, once converted into sulphate of ammonia, would introduce into the soil a quantity of ammonia equivalent to that which would be afforded it by 6.250 pounds of horse's liquid, and that four pounds of gypsum increases the produce of a meadow 100 lbs. He says that it decomposes slowly, and thus accounts for one dressing lasting several years.

If the farmer cannot obtain plaster of Paris for his clover leys, he may use coal ashes at the rate of forty-five bushels to the acre, which will yield as much sulphuric acid as 5½ bushels of gypsum. These ashes contain about 10½ per cent of sulphate of lime, and 10¼ per cent of sand and lime. Their effect will be found immediate on lucern and clover. They invariably render a clay soil permeable, mechanically, and disintegrate it sufficiently to admit atmospheric gases, besides affording the requisite amount of sulphate of lime. If spread over the surface of a garden they will completely prevent the depredations of mice, as they cannot burrow through them, and cause nearly all vegetables to come to maturity three or four days earlier than they would without them. This may, to a certain extent, be attributed to the manurial substances they contain, and their power of absorbing heat. Peat ashes, in composition, nearly resembles coal ashes, and owe their fertilizing qualities to the presence of sulphate of lime, which compose fully one-third of their bulk; the balance is made up of silicious, calcareous and aluminous earth's, with sulphate of potash and common salt. After burning peat, if you would discover whether the ashes contain gypsum, or not, add strong vinegar to them; and if sulphuretted hydrogen—which smells precisely like rotten eggs—is emitted, you may be sure they do.

One hundred parts is composed of sulphate of lime	13
Silicious earth	30
Carbonate of lime	42
Sulphate and muriate of soda	8
Oxide of iron	4
Loss	3
	100

Gas lime is sometimes made use of near cities, as a manure, but I do not consider it of any value, except as a source through the medium of which gypsum may be added to the soil; those who use it say that it contains a large percentage of ammonia; this is not so, because quick-lime prevails in it, which expels ammonia immediately.

Mr. Smith, of Connecticut, stated that, upon one of his farms, plaster is very beneficial upon all crops, while upon another farm plaster is of no advantage. In that State, generally, it is advantageous to the potato crop.

GRAPE CULTURE.

Andrew S. Fuller spoke upon this subject, in answer to Dr. Underhill's remarks at the last meeting. The great perfection to whieh the Messrs. Underhill have brought the Isabella grape is, probably, the very highest point to which it can be brought by cultivation. Still, it fails to give satisfaction, to those who know that there is a better sort of grapes in the world. The Isabella is an improved Fox grape, but it does not, in the very best seasons and favorable climate, ripen so as to make it entirely satisfactory. It was hoped that the Catawba would supply the deficiency felt by all the seekers after a better grape—in fact, a perfect one. But in this the public have been disappointed. But the interest taken in the cultivation of the Isabella and Catawba grapes has awakened an interest for something better. It was this interest that has produced the Diana, the Anna, the Rebecca, the Delaware, and several other sorts, which are certainly far superior to the Isabella or Catawba. One of the most important facts to be borne in mind in favor of the Delaware grape, is, that it ripens two weeks.

earlier than the Isabella, and will produce good ripe fruit, where it cannot be obtained from either the Isabella or Catawba. The quality of the fruit is sufficiently certified by some of the best amateur grape culturists in this country. The reason that we have not any as extensive vineyards of these improved varieties, as we have of Isabellas and Catawbas, is simply because the demand for garden culture has heretofore absorbed all the plants that could be produced. Vineyards sufficient to supply the great demand for these varieties are now beginning to be planted, and the fruit will be introduced into market in a few years, and then it will be seen which is preferred by the public.

Mr. Cavenach exhibited a specimen of a vine, trained by a Mr. Suydam, of Brooklyn, by a system of layering and long extension of the vine, and showed wherein the system was erroneous, and not calculated to give satisaction to those induced to adopt it.

Wm. S. Carpenter.—My place is 27 miles north-east of this city, in a valley, not highly elevated above tide-water, and I cannot get my Isabellas and Catawbas to ripen with the utmost attention that I can give them.

John Harrold.—The same thing is true with us at Hempstead, L. I., while Delawares have ripened perfectly.

Mr. Cavenach.—The reason that some of the grape-vines in the city do not grow any better, is that they are saturated all winter with soap suds and kitchen slops. I would never trim vines later than February, and earlier is much better.

The subject was still further discussed by several persons, without eliciting any important new information for the people.

CULTIVATION OF FRUIT TREES.

The following letter upon this subject was introduced by Solon Robinson:

"Millions of young fruit trees sent west during the past few years have perished. This has generally been ascribed to the severity of our winters. But the apple tree used to be regarded as especially hardy, and when in good condition able to bear the severest cold unharmed.

"There is another circumstance: many of our best varieties of apples show indications of degenerating in quality. Many trees of the Baldwin, Swan, pippin, and some other varieties, fail to ripen their fruit well, and it decays early with the bitter rot.

"Other facts I could mention, but they will undoubtedly be brought out in a discussion of the general subject by the Club, should it be kind enough to take it up. It is one that very deeply interests farmers and all classes of men who wish to cultivate fruit, whether for the market or private use; and I am satisfied that the present mode of rearing and planting fruit trees cannot long be depended upon. I could wish, therefore, that the Farmer's Club of the American Institute would take for discussion the question:

"Whether the present system of cultivation of fruit trees is not injurious to their constitution and permanent health."

"I refer particularly to the practice of forcing the growth of the stock and young tree after grafting, by high manuring. I also refer to the practice of using scions in grafting from young, rapidly-growing nursery trees, whose wood is not well ripened, instead of taking them from old, bearing trees, whose wood is of mature growth. I also refer to the practice of dividing roots, in root grafting, into small pieces.

"The same objection seems to me to lie against the present mode of cultivating grapes from buds, and forcing their growth by heat and manures."

REMEDY FOR THE BUG PEST.

A letter from Jackson, Michigan, states that the dust of a flouring-mill smut machine, sown upon bug invested plants, will prevent their depredations better than any other dust application. Its odor and taste are offensive to the insects.

The next meeting will be held on Monday, Feb. 27, and the subject of spring crops, generally, will be in order.

The Club adjourned.

H. MEIGS, *Secretary.*

February 27, 1860.

Present, 75 members. Mr. Pell in the chair.

The Secretary read the following translations, &c., made by him, from the foreign and home articles received by the Institute, since last meeting, viz:

TRANSPLANTING TREES.

The Scientific American, of the 25th February, 1860, copies from an Indiana paper what I know to be a good rule. I have practiced it on thousands of the tenderest plants, having transplanted in the clear sunshine of a dry, hot day, young peppers and egg plants, the most difficult, without arresting their growth one day, and without coverings.

The place for the tree is excavated to the proper depth, and of a width to received the suitable roots. This hole must be filled with soft water, the tree set in, and the earth sifted over the roots until enough; move the tree gently to and fro, on all sides, that the soft, wet earth may be on all sides of every root and fibre. This plan is more tedious than common transplantation, but it would be profitable even on cabbage plants, by acres.

AMERICAN WINE.

Connecticut is said to make 200,000 gallons of wine a year from her own grapes. Her tobacco crop is worth $300 per acre. France has four million acres of vineyard; the crop, in good years, is worth 140 millions of dollars.

Strawberries (it is asserted,) have yielded 160 bushels per acre—sold for $1,300. Judge Howell, of Canandaigua, has a pear tree of the *Virgaleu*, which has not failed of a crop in 40 years—averaging, the last 20 years, 20 bushels, worth $60. The tree is 70 years old. In the State of Mississippi there is a pear orchard of 15,000 trees. A southern gentleman sends his peaches to the northern States and sells them for from $7,000 to $10,000 a year.

It is said that our Bartlett pear is an old French pear; the *Bon Chrétien:* (Good Christian).

TEA CULTURE IN THE UNITED STATES.

Mr. Debow, in his review for this month, (February,) recalls the noble effort of our friend and member, Junius Smith, to grow tea in South Carolina, and that recently its growth is attempted in Washington. To understand its importance to the United States, we give the following statistics:

Teas to the	No. of lbs.
United States, per annum,	7,000,000
Russia,	10,000,000
France and her colonies,	500,000
Holland,	1,000,000
German States,	500,000
Spain and Portugal,	100,000
Italian States,	50,000
South America,	500,000

The present consumption of tea, annually, is not less than 100 million pounds. The average cost in China, per pound, is about twenty cents, and that is so low as to cause adulteration. The Yon-Pou-Chong tea, sent to Russia, sells in China for *seven dollars a pound.* A still finer sort never leaves China, for the mandarins buy it all for their own use. China consumes at about 4 pounds a head per annum, and the entire crop of China is about 1,500,000,000 pounds. The tea latitudes of China are from 27 degrees to 31 degrees north. On Madeira it does well, 8,000 feet above the level of the sea.

The history of tea, in China, goes back no farther than the year 800, as a general thing. A wild tea grows in Assam, 30 feet high. Debow refers to P. L. Simmonds, of London, on the "The Commercial Products of the Vegetable World," "Williams on China," and to "The United States Consular Reports."

Messrs. Fowler and Wells received the following note from their correspondent, Mons. A. Manze, of Augusta, Georgia; a note relative to his culture: He has olive trees doing well, yet too young to bear fruit; and the cork oak, *Quercus suber*, and the Iujube.

The date was tried long ago, in Florida, without much success. The cork tree would be very valuable to the United States.

PROGRESS OF THE STEAM PLOW.

It seems that it will prevail, and owing to its high cost, one plow will be employed by several adjacent farmers, with great advantage, as is now done with some threshing machines, mills, &c.

The Royal Agricultural Society, of England at the last meeting in December, offered premiums for best essays, viz:

Berkshire agriculture,..................................	50	sovereigns
Application of manure,..................................	20	do
Proper use of straw, on a farm,.........................	10	do
On farm capital,..	10	do
On seed beds,...	10	do
Adulteration of seeds,..................................	10	do
Best essay on any agricultural subject,.................	10	do

BUTTER.

Says the London Magazine: The United States make over 300 million pounds per annum — worth 70 millions of dollars. The butter in Paris markets, annually, is about 16 millions of pounds.

[London Farmers' Magazine, August, 1859.]

FISH MANURE.

Cuthbert Johnson says: "Guano is a product of fish, who live exclusively on fish. Experiments have already been made to imitate guano artificially on coasts abounding in fish. At Newfoundland the codfish, rejected by the fishermen, amount to 280 out of 400 tons. These are used as manure. So states Mr. K. Hamilton, Governor of Newfoundland, and that fish is universally employed for that purpose—the herring, caplin, and the heads, bones and entrails of the codfish, too. They compost the fish with peat bog, earth, clay, &c. He says it is superior to guano as a fertilizer. On their gravelly, unpromising soils near St. John's, it gives grass and potatoes, not surpassed anywhere. To prepare the fish for use, a flat, drying-surface stove is all that is wanted to expel the water, so that the dried fish can be pulverized. It is then comparatively free from any offensive smell."

The bat dung, from caves in the West Indies, is excellent; no smell; pulverulent, and worth £7 per ton ($35.)

In 1782 the French employed in the codfish trade, Newfoundland, 340 ships, carrying together 36,600 tons, employing 15,000 men.

STEAM PLOUGHS AND CULTIVATORS.

Royal Agricultural Society; meeting at Warwick last July. Fowler's four furrow plough. Premium £50. Ploughed *seven acres a day.* Fowler's three furrow plough. These are not like Fawkes', at all.

THE APPLICATION OF NIGHT SOIL AS A MANURE.

By Dr. Bartlett, formerly of the N. Y. Albion.—The use of night-soil for agricultural purposes has been checked, and indeed almost prevented, by its disagreeable odor. This objection is nearly imaginary, or at any rate easily obviated. It is now known that mixing this substance with earth, speedily deodorizes it and changes it to a state in which it can be handled without disgust or a disagreeable sensation. Several writers in Great Britain have already demonstrated this fact, among others Mr. Hopley, of Eastbourne, and especially the Rev. Mr. Moule, the Vicar of Farrington, Dorset, who has lately put forth a pamphlet of great interest on this subject entitled, "Health and Wealth instead of Disease, Nuisance, and Expense, caused by Cess-Pools, &c."

The following extract from Mr. Moule's work explains his meaning, and the mode in which he puts his theory into practice :

"The power and efficacy of this agent will, however, be best understood and believed, if I give a simple narrative of what, during the last six months, it has done for my own family, averaging during that period fifteen persons daily. Eight months previous to this period, under a strong impression of the evils either occasioned, or likely to be occasioned, by the vault or cess-pool on my premises, and feeling it to be a nuisance to my next neighbor as well as to myself, I filled it up with earth, and ever since I have had everything that otherwise would have gone into it received and removed in buckets. And even this mode of removal, though offensive in idea, has proved far less so in reality, than even a very small portion of the evils it is intended to remedy. At first, the contents of these buckets were buried in trenches about a foot deep in my garden; but on the accidental discovery that in three or four weeks after being thus deposited, not a trace of this matter could be discovered, I had a shed erected, the earth beneath it sifted, and with a portion of this the contents of the buckets every morning mixed, as a man would roughly mix mortar. The whole operation of removing and mixing does not occupy a boy more than a quarter of an hour. And within ten minutes after its completion, neither the eye nor nose can perceive anything offensive. This was the first observation I made. The next was this, that when all the earth, which did not exceed three cart-loads, had been thus employed, that which had been first used was sufficiently dried to be used for the same purpose again; and it absorbed and deodorized the offensive matter as readily as at the first time. And so singularly does this capability continue, that a portion of it is now being used for the fifth time for the same purpose; and thus all that offensive matter, which otherwise would have been wasted in the vault, a nuisance to my house and the neighborhood, and a source, it may be, of sickness and disease, is now a mass of valuable manure, perfectly inoffensive both to the eye and nose. I have taken fifty or sixty persons to see it without previously acquainting them with its nature, and not one has guessed it. All have declared it to be wholly without offence. Two have handled and smelt that, in the afternoon, which had been mixed in the morning, without being able to discover its nature. And more than this, I have the same day submitted some to strong fire heat; and that which, unmixed with earth, would under such heat have been intolerable, in this mixed state, emitted no offensive smell whatever.

"The writer of this happens to know the locality of Mr. Moule's experiments, and is of opinion that the *chalky* stratum of that part of Dorsetshire eminently fits it for a favorable issue to such investigations as Mr. Moule has been making; but he is, nevertheless, fully of opinion—in fact he knows it from personal observation—that earth of all kinds speedily absorbs and deodorizes night soil when mixed therewith; and that, in a short space of time, the mass can be handled and used as a manure without objection of any kind. We are glad to state that the prejudices against it are fast giving way, and that it is coming into use in many parts of New Jersey, Long Island, and elsewhere, the cities supplying it in large quantities. Agriculturists speak of it with admiration, and fully confirm the statements that have been made in regard to it, not only as a fertilizer, but as to the readiness with which it can be deodorized on being mixed with any kind of earthy matter.

"We have not heard of night-soil being mixed with gypsum or plaster, but from the readiness with which this latter substance combines with and fixes ammonia, it is probable that such combination would be attended with good results, as it is based on correct chemical affinity.

"But the most curious fact is yet to be stated. Mr. Moule calls the attention of his readers to a passage in the Bible, Deuteronomy, chap. xxiii, verses 12 and 13. By reference to this passage in Holy Writ, it will be seen that mankind had a scriptural injunction how to dispose of the excrementitious part of our nature precisely as pointed out by modern writers. This was done 3,000 years ago, and by the inspired hand of Moses! Yet we have been heedless of it almost to the present hour. How true is the trite adage—'nothing new under the sun.'

"The great objection to the use of night-soil being obviated by the process above described, it remains to be pointed out which is the best mode of conveying the substance from towns to the country. This will suggest itself to those who are engaged in the business, and if it can be done economically, there will be a large demand for the article, for as a fertilizer it is most valuable, while it takes from the cities a *nuisance*, which, when carried into the country, produces a *nutriment*. The farmers of Monmouth county, New Jersey, as we have said, are already alive to its value, and beginning to employ it extensively, and with the best results. They deodorize it by mixing with earth exactly on Mr. Moule's plan; and when so mixed they handle it without reluctance. A pinch or two of the compost put in each hill of corn, gives the seed the early start, which is so necessary in a cold and backward spring. Already several vessels have arrived at Millstown Point with the article, stowed in bulk, as the sailors express it. From the vessels' holds it is passed into tight box-wagons, made for the purpose, and in this way conveyed to the respective farms for use, without unpleasantness to any one. The market gardeners on the South river have employed it, and produced from it the finest cabbages sent to market.

"A few years ago there was a contrivance in use for exhausting privies by means of a hose and pump, acting upon the principle of a stomach pump. With the use of this instrument vaults can be emptied with expedition and cleanliness, and the offensive matter carried in carts and discharged into vessels in the night-time, and by these vessels taken to the country. When sold at seven cents per bushel, as it now is at the landing places, it becomes the cheapest manure known, and deserves the attention of every practical agriculturist in the country.

"The wisdom and benificence of the Deity, in thus making the excrementitious parts of our system the elements for re-producing food, is wonderful; indeed, it seems a part of Nature's plan, as the rule prevails throughout animal life. Thus guano is the offal of birds; the contents of the barn-yard the dung of cattle, while the accumulation in privies is the excrement of man; and so the process goes on, from food to faces, and from faces to food again. Such an universal law teaches us that the earth is capable of sustaining a much larger population than has ever entered into our computations."

APPLICATION OF STRAW.

Among other things for which a premium of $50 is offered, in England, is the proper application of straw to land. It is a question well worthy of consideration in this country.

TRANSPLANTING TREES.

It is recommended to dig a large hole and fill it with water, and then sift soil into the water and set in the trees and shake them so as to bring every root fully in contact with the soil.

Mouldy hay never should be fed to horses; it is poisonous.

PEARS IN MISSISSIPPI.

There is a pear orchard in Mississippi, of 15,000 trees.

TEA IN THE UNITED STATES.

This country consumes more tea than any other country, and it is earnestly recommended to grow tea in this country. The whole crop in China, is 1,500 millions of pounds, and it grows only in about four degrees of latitude.

COMPOSITION FOR TREES.

Mr. Burgess, and old English gardener, communicates the following recipe, as valuable for all gardeners and fruit-growers, as a fertilizer and preventive of destructive insects. Mr. Burgess says:

"I have used it, with great benefit to trees and vines, for the last thirty years, in England and America. I never gave it to any one except my sons. What I wish in return, is, for every one that uses it, to report to the Institution what they think of it:

"1 peck quick lime; ½ peck wood ashes, sifted fine; ½ peck sut, from wood, is best; ½ peck sheep's, or deer's dung, or cow's—first two are best; ½ peck dog's dung, or night soil—the first is best; 7 lbs. of soft soap; 7 lbs. silver sand; 2 lbs. sulphur; 7 lbs. burnt bones; 3 lbs. salt.

"Place them all on a board floor, with human urine; mix them as thick mortar, make a cone of it, and let it lay two days; then braid it well, a little at a time, with the back of a spade, and put it in a barrel for use. It will keep good two years, if the air is excluded.

"For use, mix it with urine as thick as paint; apply it with a brush made with horse-hair—a large one for big parts, and a small one for twigs. Keep it stirred with a flat stick as it is used. Prune all the trees in

November, or first week in March, then apply the composition; if done in November, repeat it again in March, on the large branches.

"After the trees are washed, remove the soil, with a fork, 3 feet round the tree, and 6 inches deep; sow 2 lbs. salt evenly all round, then return the soil; leave it rough. First week in April apply 5 pails of strong liquid from the farm-yard; next day, point the 3 feet bed over, and do not tread on it; in June and July, apply the liquid 4 times, and point up every time.

"Pull all old bark from the vines, and scrape the stems of trees that are tough and mossy. The composition is good to keep horses from biting city trees."

Solon Robinson stated that a letter from Thomas Young, of Hamden, Union county, Ohio, proposes, for a consideration, to tell any one how to prevent the injurious effects of frost upon all small fruit trees, in any locality. His terms are, no cure no pay. I give his address, so that any one who has a fancy to investigate this new thing, may do so if he likes.

Mr. Burgess thinks his composition will produce the same results, and that it will make the trees so vigorous that insects will not trouble them.

Mr. Titus stated that an application of half an ounce of aloes, in two or three quarts of water, applied to trees, has a remarkably beneficent effect in destroying all sorts of insects. It is housed around the trunk of the tree.

Mr. Jos. T. Fuller stated that he used an ounce to the gallon, putting it on with a brush upon the trees, and with excellent effect.

Mr. Titus said he also applied it to grape vines, and found it very valuable. Others tried it on mellow vines,with a watering pot, and it kept off all the bugs.

Dr. Trimble thought it would not keep off the curculio; it would not diffuse itself through the trees sufficient to deter this pest from destroying the plums.

BARK LICE.

Wm. S. Carpenter showed specimens of the white and black scale upon the bark of apple and pear trees, which destroys the health of the trees. He had in some cases, but not all, cured the evil with a solution of potash.

Mr. Quinn.—The caustic soda wash applied once a year will kill these insects—one pound of soda heated to redness, and then dissolved in a gallon of water, and applied with a brush.

The Chairman objected to the use of whitewash; he likes the soda wash much better. He thought the whitewash would injure the growth and health of trees, while the soda wash makes the trees more healthy.

A NEW PLANTING MACHINE.

D. R. Prindle.—A model of a new planting machine, that holds itself in the proper course, so that the operator can ride and manage the machine as easily as he would a wagon. It also works upon uneven ground, and drops any kind of seed, at any depth required, in even rows or hills. It is so arranged that the hills can be checked so as to plow both ways, and will plant twenty acres a day. It can also be made to plant in a continuous drill, and at any desired width, two or three rows at once. The cost is $35. It appears well adapted to the purpose, and an improvement upon its numerous predecessors.

STEAMING FOOD FOR CATTLE.

Mr. Prindle also exhibited a very compact machine for steaming food for cattle, costing $28.

GRAPE CULTIVATION.

This subject having been on the calendar some time, was called up to-day, and Dr. Underhill made an address upon the subject of his particular sort of grapes, contending for the excellence of the Isabella, and going into the history and reason why our native grapes have the prefix of fox attached. He contends that the foxiness of the wild grapes is lost by cultivation, and that the Isabella and Catawba are, par excellence, the best and most cultivated of all others.

R. G. Pardee contradicted the assertion of Dr. Underhill, that grapes would not succeed in clayey soils, and instanced some of the most successful cases of grape culture upon clayey soils in Central New York. In one garden, where there are twenty sorts of grapes growing in a most obstinate clay, all succeeded; but the Dianas are the best of all.

Wm. S. Carpenter.—I have just such sandy soil as the doctor describes, as the only suitable sort for grapes, and I cannot succeed with Isabellas.

Dr. Underhill.—I take off four-fifths of the fruit in the blossom, or when it is about the size of wheat.

Mr. Provost, of Brooklyn.—I have two vineyards upon a stiff blue clay, and I have one native vine that gave me a barrel of wine last year, and my vineyard has borne well for twenty years, and it bears best where the land is most clayey; and I have made 1,500 gallons of wine frcm an acre. I dress the surface of my ground every year with sand. I do not pull off my grapes, but let the vines bear.

Mr. Cavenach objected to a statement of Dr. Underhill, that the Delaware is a feeble grower. So far as he knows, it is as strong a growing vine as any that he knows.

Wm. S. Carpenter stated that his Delaware vine is a vigorous, strong grower.

Mr. Cavenach stated that all vines that were trimmed in February, a few days ago were killed down to the ground.

John G. Bergen.—The same thing occurred to many vines on Long Island, to vines that were not pruned at all.

Mr. Pardee objected to pruning vines with upright instead of horizontal spurs.

KYANIZING TIMBER.

J. W. Fairchild, a successful kyanizer of timber for his own use, at his place at Hudson, N. Y., writes to correct an error in the report of Mr. Pardee's lecture at New Haven. He says the report states that the mixture is composed of one pound of blue vitrol to twenty pounds of water. It should be twenty quarts of water or forty lbs. It is important that this correction be made, as with only twenty lbs. of water the liquid would destroy cordage and many fabrics that are preserved by this process, as well as wood.

Mr. Pardee stated that he gave the proportions as reported, from a letter of Mr. Fairchild ; it was, probably, an error or oversight of his, and the correction should be made.

The next question for discussion, at the meeting next Monday, will be "How much seed per acre?" This will embrace everything that is grown as farm crops, and will involve thick or thin seeding.

H. MEIGS, *Secretary.*

Monday, March 5th, 1860.

Present, 80 members. Edward Doughty, of New Jersey, in the chair.

The Secretary read the following extracts from foreign and domestic articles received by the Institute, since the last meeting, viz:

FUCHSIA SERRATIFOLIA.

This plant is deemed a fine variety. Mr. Gordon says it is readily grown from slips, provided it be done about the beginning of April; in a light soil, mixed with much sand; in a box lightly warmed, until roots are developed. Keep clear of cold; in summer, re-pot the plants twice, in larger pots; leave them there the following winter. About the middle of the next May, trim them, and set them in the garden borders. The soil must not be very rich, for then the flowering is small. In good, decomposed stable manure, added to the soil, I have seen a flourishing plant produce only one flower. About the middle of September, lift the plants and pot them in pots, twenty centimetres (about 8½ inches,) in diameter, with the same soil in them. Keep them in a shady place, and before spring, or a short time before, they will cover themselves with flowers. They want free watering while flowering, and the pots must be well drained. With these precautions, they last several years, and bear better than when younger.

LOBELIAS

Are interesting in the garden — some think very much so — although, some of them are of low stature. Lobelia splendens, L. fulgens, L. cardinalis, and another, have been fashionable, for some time, in our gardens —so has the L. serratifolia; but generally, only L. splendens and L. fulgens, exclusively almost. Generally, the lobelias grow readily from seeds, or slips; but the English gardeners prefer shoots to all other modes. They usually take shoots from old plants, in October, and put each in a little pot, and transplant, in February, into larger pots, with all about them ; and early in April, into still larger pots. Keep them moist; they will flower in July, and do so the rest of the summer. If they show only single bunches of flowers, pinch off the ends of the branches; they will then flower, but grow no taller.

GRAFTS.

William S. Carpenter.—I have here several varieties of scions from my orchard, to present to members. One of which, from France, is a very early variety, of excellent fruit, without a name.

The Secretary.—Then let us name it. I propose that we call it the Carpenter apple. This was agreed to unanimously.

Mr. Carpenter also presented, and highly recommended, scions of the Gifford apple, which ripens in harvest time, and is of fine size and excellent quality. It is a variety not well know, but one that I must highly recommend.

THE FOOD A MAN CONSUMES.

Solon Robinson said: Alex. Soyer's Modern Housewife gives the following calculation as the probable amount of food that an epicure of seventy years might have consumed. Suppose his gastronomic performances to commence at ten years, he will make 65,700 breakfasts, dinners, and suppers, to say nothing of luncheons and extra feastings. To supply the epicure's table for sixty years, Soyer calculates he will require 30 oxen, 200 sheep, 100 calves, 200 lambs, 50 pigs; in poultry, 1,200 fowls, 300 turkeys, 150 geese, 400 ducklings, 263 pigeons; 1,400 partridges, pheasants, and grouse; 600 woodcocks and snipes; 600 wild-ducks, widgeon, and teal; 450 plovers, ruffes, and reeves; 800 quails, ortolans, and dotterels, and a few guillemots and other foreign birds; also, 500 hares and rabbits, 40 deer, 120 Guinea fowl, 10 peacocks, and 360 wild-fowls. In the way of fish, 120 turbot, 140 salmon, 120 cod, 260 trout, 400 mackerel, 300 whitings, 800 soles and slips, 400 flounders, 400 red mullet, 200 eels, 150 haddocks, 400 herrings, 5,000 smelts, and some hundred thousand of those delicious silvery whitebait, beside a few hundred species of fresh-water fishes. In shell-fish, 20 turtle, 30,000 oysters, 1,500 lobsters, or crabs, 300,000 prawns, shrimps, sardines, and anchovies. In the way of fruit, about 500 pounds of grapes, 360 pounds of pine-apples, 600 peaches, 1,400 apricots, 240 melons, and some hundred thousand plums, green-gages, apples, pears, and some millions of cherries, strawberries, raspberries, currants, mulberries, and an abundance of other small fruit, viz: walnuts, chestnuts, dry figs and plums. In vegetables, of all kinds, 5,475 pounds weight, and about 2,434¾ pounds of butter, 684 pounds of cheese, 21,000 eggs, 800 plovers. Of bread, 4½ tuns, half-a-tun of salt and pepper, near 2½ tuns of sugar. His drink, during the same period, may be set down as follows: 49 hogsheads of wine, 13,683 gallons of beer, 584 gallons of spirits, 342 gallons of liquor, 2,394¾ gallons of coffee, cocoa, tea, &c., and 304 gallons of milk, 2,736 gallons of water. This mass of food, in sixty years, amounts to no less than 33¾ tuns weight of meat, farinaceous food and vegetales, &c.; out of which I have named in detail the probable delicacies that would be selected by an epicure through life. But observe that I did not count the first ten years of his life, at the beginning of which, he lived upon pap, bread and milk, &c.; also, a little meat, the expense of which, I add to the age from then to twenty, as no one can really be called an epicure before that age; it will thus make the expenses more equal as regards the calculation. The following is the list of what I consider his daily meals:

Breakfast.—Three-quarters of a pint of coffee, four ounces of bread, once ounce of butter, two eggs, or four ounces of meat, or four ounces of fish.

Lunch.—Two ounces of bread, two ounces of meat, or poultry, or game, two ounces of vegetables, and a half-pint of beer, or a glass of wine.

Dinner.—Half a pint of soup, a quarter of a pound of fish, half a pound of meat, a quarter of a pound of poultry, a quarter of a pound of savory dishes, or game; two ounces of vegetables, two ounces of bread, two ounces of pastry, or roasts; half an ounce of cheese, a quarter of a pound of fruit, one pint of wine, one glass of liqueur, one cup of coffee, or tea; at night, one glass of spirits and water.

MAN'S CLOTHING.

I have made a little calculation to add to the above board bill, to show how many yards of cloth such a man would naturally use up during the same period. My estimate is, that a full-dressed man carries about fifty yard of cloth upon his body, or, at least, it has taken that many square yards of cloth to make the following garments: one under and one over shirt and drawers, 8 yards; vest, with all its inside and out, 4 yards; coat, overcoat and cloak, 32 yards; the handkerchiefs in the coat and cloak pockets, 2 yards; pants, lined, 4 yards. Then we may add a night-shirt, 4 yards, and morning wrapper, 10 yards, and we have 64 yards for a single suit. Allow six of these suits a year—of some garments, he will want more, and some, less than six; but take that as an average, and we have 384 yards for the gentleman's wardrobe one year. Multiply that by sixty years, and we have 23,040 yards of cloth, which appears a fair allowance, as we throw out the ten years of childhood. With these garments he will want, each year, two pair of boots, two pair of shoes, two pair of slippers, two pair of rubbers, or overshoes—480 pairs. With these, he will wear sixty dozen pairs of stockings, and four hats a year—240 hats. I will say nothing about the yards of cloth that he will want about his toilet and table, his carpets and curtains, and his bed, with its daily change of bedding; but you can imagine it would make a large spread. The great question for consideration, in an agricultural point of view, is this: Could such a consumer of earth's products produce as much as he consumed, with all industry applied during life, or would he be dependant on the labors of others?

Wm. Lawton made an address upon the necessity of a great diversity of food, and its benefit to health and intellect, and upon this a discussion of some length followed.

Dr. Humphrey.—Men and animals all need a great diversity of food, and the highest quality to produce the highest condition of intellect. It is, therefore, important that we should study to increase earth's products, and improve their quality, to produce the highest condition of perfection in man. A man, it is true, may be a glutton, and consume mountains of flesh and rich dishes, but that is not the point. It is, that we all should consume the best food possible to be produced, and in sufficient variety to give healthy results.

Prof. Mapes.—It is not the most costly, or the most luxurious living that we would advocate, but it is a variety of food. The difficulty is, that we are tempted, sometimes, by a variety of dishes at one meal, to eat too much. This is no argument against variety of food. As to the simplicity, alluded to, of the rice food of China, it must be remembered that they are the best cooks in the world, and make a great variety of dishes out of one simple article of food; and it is very true that some of the Chinese possess a very high order of intellect. It is not a necessity that man should eat a great quantity of meat, or drink alcohol, to produce a high order of intellect. Simple as the Chinaman's food is, the nation produces mechanics of high order. We haven't brains enough even to find out how the Chinaman solders his tea-lead. The Chinese are ahead of us in a great many of the mechanical and fine arts. There isn't a man outside of China that can take the rattan bands of the ordinary tea-chest off and tie them on again as John Chinaman did. There is another fact, that, although the Chinese have not the great variety of material for food that we have, they have the art of making a great variety of food-dishes. They have the taste for variety, and the ability to procure it out of simple means. Man certainly requires a great variety of food, and that which is the richest in the elements that constitute the living man; but it is a great mistake to think that those articles of simple food must be concocted into "made dishes" of various things which destroy health.

VINE PRUNING—PHILOSOPHY OF PRUNING IN THE FALL.

Andrew S. Fuller gives the following as the philosophy of fall pruning: During active growth of leaves and stems, the liquid portion of the sap is exhaled almost as fast as it enters the vine. When cold weather first checks growth, it does not affect the roots, which continue absorbing food. In autumn, then the vine becomes surcharged with sap, which, during winter, undergoing its natural change, would deposit solid matter throughout the entire length of the vine, so that each bud would be equally supplied with its quota of food to commence vegetation anew in Spring. Now, suppose a portion of the vine is cut away in the fall, or early winter, it is apparent that what remains has the whole root for its support, and it may receive all the strength that would have been diffused throughout the unpruned vine. These few buds will, of course, put forth in spring much more vigorously, and continue to send out fruit-bearing wood in greater perfection than it is possible for an unpruned vine to do.

The rule for pruning, then, should be: If the vine is weak, prune early, that is, as soon as it sheds its leaves. If your vine bears fruit, and is not a vigorous grower of wood, and you wish it to produce more, prune early. If your vine is a vigorous grower, but a shy bearer, prune late. If severe cold may soon be expected, at the time you are pruning, do not cut the cane near a bud, but several inches above it. If desirable you can cut away the spur above the bud, after cold weather is past. The growth of wood, or fruit, is regulated more by pruning than by the soil in which the vine is grown.

It may be set down as a fact that no vine in the climate of New York can ripen a crop of fruit upon all the wood its roots will produce.

THE QUANTITY OF SEED PER ACRE.

This question of the day was called up and opened by the Secretary, who read the following statement furnished by one of the oldest and best seedsmen of the United States, Alexander Smith, No. 64 White street, New York:

"Wheat, on rich land, 2 bushels, on poor land, 2½; rye, on rich land, 2 bushels, on poor land, 2½; barley, on rich land, 2½ bushels, on poor land, 3; oats, on rich land, 3 bushels, on poor land, 3½; clover (red top), 12 pounds; timothy, 1 peck; grass (red top), 3 bushels; orchard, 1½ to 2 bushels."

POTATO SEED.

Wm. S. Carpenter.—I have tried a great many experiments with potatoes, and have come to the conclusion that two eyes to the hill is better than more seed. I plant in drills, 15 inches apart in the drill, and rows 3 feet apart. I do not approve of deep planting. This requires 8 or 9 bushels per acre.

CLOVER.

I would sow April 1, 10 pounds to the acre, upon winter grain land, which was fall seeded with timothy at the rate of 1½ pecks per acre, which I take care not to cover deeply, never over an inch.

CORN

Depends upon the quality of the land, which cannot be too highly manured. I plant rows three feet apart, and seed in drills, one in a place, eight inches apart. I grow the improved King Philip, 100 bushels per acre.

OATS.

I sow three to four bushels to the acre, and get 75 bushels per acre as a crop. I think oats are generally seeded too thinly.

RYE.

One and one-half bushels per acre, upon well-prepared ground, carefully put in, is about the right quantiy upon our Westchester farms. It is not generally sown as thick as that by most farmers.

WHEAT.

I would sow two bushels per acre; and if the land is in good condition a fair crop can be grown in this region.

POTATOES.

Prof. Mapes.—It is very important to ascertain how much seed per acre. In an experiment in the island of St. Helena, made with military exactness, with whole and cut potatoes, and at all depths, the following results were ascertained. Whole potatoes gave the best monetary results, and the best potatoes. And flat surface culture is recommended in all cases, and so is shallow planting—that is six inches deep. The experiments were made under the direction of General Beatson, and he has published a large book full of these nice details. I loaned this book to some gentlemen at the American Phalanx, in New Jersey, and they tried the experiments carefully, and came to the same conclusion that Gen. Beatson did. I have also tried these and other experiments, and have come to the same conclusion, that whole potatoes for seed are altogether the most profitable. I would plant those of large size, and very round. Potatoes left in the earth where they grow over winter are much the most solid and nutricious. A potato will be preserved sound through the winter at less than one foot deep.

Mr. Carpenter.—We all know that a whole potato pushes forward earlier than cut ones. But, as there is an average of eight eyes to a tuber, there will generally be too many stalks. Where I plant two eyes, my potatoes grow sound, and of large size. I believe that three inches is deep enough to cover the seed.

Prof. Mapes.—Upon two fields, one underdrained, and one not, both planted alike, with the same seed, the crop nearly all rotted upon the undrained land. When I plant whole potatoes, my crop is of very even size. One of my neighbors used 40 bushels per acre on the black loam of Newark meadows, and got 550 bushels per acre. I get, with much less seed, 400 bushels per acre.

Mr. Carpenter.—My neighbors have become convinced that a great saving can be made in seed potatoes by cutting the seed, and that the result is in all respects as good as when they plant their seed whole. My crop last year produced tubers rather too large to suit this market. Seed may be put in the ground as soon as it is cut, or kept out, and coated with plaster or dry dust.

WHEAT PLANTING.

Prof. Mapes.—In England farmers are of late years disposed to dibble wheat. This will only answer in well prepared soil. In undrained land there is a necessity for using more seed, because the wheat does not tiller as well. By dibbling, only one-eighth as much seed is used as by broadcast sowing. It is stated that the use of Croskill's clod-crusher makes a difference of five bushels per acre. This is effected by breaking the lumps, and putting the land in the best possible condition.

Mr. Suydam, farmer, of Long Island.—The farmers on the island who grow potatoes for this market have studied a good deal about how to plant potatoes and how to save seed. Some of them cut their seed like Mr. Carpenter, and plant it in drills twenty inches apart, the rows at three feet distance. Others plant in the same way with whole seed, and, I believe, with results universally in favor of the whole seed, though it uses more seed the quantity being from 12 to 14 bushels per acre.

Several others spoke to this question, which appeared so unsettled when the hour of adjournment arrived, that it was proposed to continue it until the next meeting, which will be Monday noon, March 12.

The club then adjourned at 2 o'clock P. M.

H. MEIGS, *Secretary.*

Monday, March 12th, 1860.

Present between 60 and 70 members. George Geddes in the chair.

The Secretary read the following papers, viz:

[From Marshall, London, 1803.]

TAPPING TREES FOR TRANSPLANTING.

Dig a trench, or hole, by the side of the tree, large enough to make room to undermine it, in such a manner as to be able to *sever the tap-root;* which done, fill in the earth again. Let the tree stand from *one* to *three* years, according to its age. By that time it will have its horizontal roots furnished with strength, and with fibres, especially those roots which was lopped off in the digging; then transplant the tree. This is not so safe on an older tree as it is with seedlings; for plants that have never been removed have long branching roots, and the fibres lie at a distance from the body of the plant. As a general rule, the more roots the better for removal.

AIR-HOLES FOR THE ROOTS!

With a crowbar make eight or ten holes around the roots, and as deep to *admit air.*

Note by Meigs.—[Marshall recommends growing potatoes in level, well tilled soil; *no hilling!*]

I am convinced that the best lessons of the last fifty years, containing deep tillage, thorough stirring of soil, and especially under-drainage, have never been excelled by man, nor can be excelled, so absolutely rational, and, of course, scientific are they.

MURRAIN IN NEW ENGLAND CATTLE.

Alarm exists relative to this cattle destroyer. The "Southern Planter," for March, 1860, published in Richmond, Virginia, quotes the "Medical Times," as stating "that in Holland there are assurance offices for cattle's lives. One company has all its assured cattle *vaccinated*, as a preservation from *contagious pneumonia!* Another company inoculates only when the disease has invaded the animal's stall. The third company does not vaccinate at all. It has been calculated that the first company has lost *six* per cent of cattle; the second company *eleven* per cent, and the third company *forty* per cent.

Mr. Meigs observed, that so much intelligent talk on agriculture now exists, that instead of speaking of the lucern from his own resources, he now would say a few words for himself:

"We frequently find published by the ignorant, such articles as this, in a *soi disant* scientific paper of this city, on the 10th of March inst.: "Some years ago Prof. Mapes laid a trap for the *merchants and lawyers*, who *monopolized the talking* of the Farmers' Club in this city, and succeeded in getting them to *expend the whole evening* in discussing the modes of telling the ages of cows by their upper teeth." Now, I answer, first: the club never meets in the evening, but always at noon, expressly to enable our farmers who come to market, to attend; secondly, that a cow has no upper teeth, and that admitted of no talk! thirdly, that Prof. Mapes, who was a merchant, has, by force of talent and science, rendered to agriculture immense service; fourthly, that for centuries agriculture lay low and wretched—a miserable routine, without genius and science. That in our own time the merchants, statesmen, lords, ladies, kings and emperors, all now study and practice farming. Victoria and Albert know more of the farm than the tenant of the office of that 'scientific' newspaper. Napoleon, Victor Emmanuel, the Emperors of Russia and Austria are devoted to the cause. Emmanuel has clothed his hills with millions of trees, which had been naked a thousand years. The merchant princes of our country, the Cushings, Handyside, Perkins, Marshall P. Wilders, Frenches, and thousands of others, have covered their granite hills with the splendors of the farm and garden. The Failes, the Watsons, Pells, with 20,000 apple tree orchard. The Mapes have enriched us by applying two indispensable powers to the land, viz., capital and knowledge. They pay all the Liebigs and Johnstons, chemists and philosophers, who do not, in many cases, know practically wheat, barley, rye or oats, in the field. Chancellor McCoun, late President of our State Agricultural Society, is a practical and scientific farmer. Reverdy Johnson has done great service by resorting to the chemists. George Washington, a surveyor, a wealthy landlord, a great soldier and statesman, devoted himself to agriculture; and there is not a hand in the newspaper office but longs for that happy day when he too can have a farm. It is the longing of every good man. The consummation of all his hopes to carry out the great original order of our Creator, to till the earth, and keep it."

NEW METHOD OF GRAFTING.

Horace Everett, of Council Bluffs, Iowa, communicates to the club a method of grafting common in Tennessee, that may be worth knowing in other localities, and which he says is not described in any fruit book that he has read. It is described as follows:

"A long, smooth shoot, or limb is selected, cut from the tree, and a sharp iron wedge driven through the limb, every four or five inches. Upon withdrawing the wedge the graft is inserted, allowing the shaved end to extend an inch or so through, so that when a graft had been inserted in every split, the limb looked like a long stick, with the grafts extending from it at right angles, a shoot of four feet having about twelve grafts. This stick or limb was then buried in the ground, the top of the grafts only being allowed to come above the surface. During the past year the grafts took root, and grew from twelve to thirty-six inches. The next fall the limb was taken up and sawed apart, between the grafts, thus leaving every graft with a portion of the limb adhering to it in the shape of a cross. I planted these grafts, and the trees grew and throve well. It is certainly a very cheap and economical stock for grafting."

KYANIZING.

W. Hance, of Marengo, Morris co., Ohio, wants to know several things, and first about kyanizing timber, by immersion in solution of copperas (1 lb. to 29 qts. of water). He asks, "Does it make any difference whether the wood is dry or green?"

Mr. Robinson.—No. Standing trees have been impregnated, and so have timbers of all sizes, in all stages of seasoning.

2. "Is it necessary to add more vitriol after the first stick is taken out."

No; not until the solution is all used up.

USE OF ASHES.

Mr. Hance wants to know "how much unleached ashes to apply to grass land?"

We should say that he will not be likely to apply too much.

Mr. Carpenter.—50 to 100 baskets of leached ashes upon grass lands, is a good application in Westchester county.

Again, the letter says:

"Also what amount of unleached ashes may be beneficially applied to corn; and whether it is better to sow it broadcast, and either plowed in or left on the surface, or to place a small portion in each hill; if the latter, how much?"

A handful around a hill before the first hoeing, scattered on the surface.

HEN MANURE.

"What shall I mix with hen manure?"

Muck, loam, dry earth, old compost; anything but ashes or lime.

MUCK.

Then he says:

"The general character of our soil, in this region of Ohio, is that of a stiff clay, interspersed with mucky swails and swamps; and, as our catalogue of manures, or other fertilizers, is a very meager one, any information upon this subject would be highly interesting to me, as well, no doubt, to many others."

Then, what more does he want? The swamps contain all the elements of fertility needed upon stiff clay. Let him plow deep, subsoil, underdrain, and use muck. He does not want a long catalogue of manures.

William S. Carpenter recommends mixing plaster and hen manures in equal bulk, a few days before using, and apply a small handful in each hill. The same, with ashes, will do well.

John G. Bergen.—I should think that a handful to the hill was rather strong.

Mr. Carpenter replied that the quantity was perfectly safe. He had often tried the experiment.

Doctor Trimble thought there was too great a disposition to mix manures. They should never be mixed at random. Hen manures is good enough without plaster.

Mr. Smith, of Lebanon, Ct.—It is thought that mixing plaster and hen manure is an excellent plan. It is said that twenty-five hens will manure an acre. I put plaster into my hen roost often. We are satisfied that feeding grain to hens is an economical use of it, on account of the value of their droppings. We use a small handful of the droppings and plaster to a hill of corn.

DELAWARE GRAPES.

Reuben Hale, of Otsego, Otsego county, N. Y., says:

"My father obtained a small vine at Delaware, Ohio, six years since, which produced the fifth season over half a bushel of splendid grapes, and has now some fifty bearing vines in the garden."

CATTLE FORAGE—HOW TO PRODUCE THE GREATEST QUANTITY.

D. H. Searle writes from "Centerville," and probably he knows what State; that he is convinced that more cattle can be kept on a farm devoted to grain crops than one of equal size in grass, if the berry is ground and fed with the straw and chaff. He then says:

If this position be well taken, the next query is, how can the berry straw and chaff be most cheaply reduced to a homogenous mass, in such a condition as will be convenient to feed to live stock, and so prepared as to go furthest in sustaining the same. My suggestion is, that mills be constructed combining the process of cutting the straw and grinding it, together with the chaff and berry, without thrashing. Bags may be prepared to stow it in secure from the ravages of rats and mice. When fed out it could be dampened if dry. The attention of the Farmers' Club, which you report, is called to this fact. The question should be discussed before spring sowing, so as to guard against another hog famine."

I have no doubt of the position here assumed. The only question, too, whether the grain should be allowed to ripen, or whether it should be cut in a green state, like sowed corn, and cured and fed as hay. It is a subject worthy of thought by many farmers.

CORN AND COB MEAL.

I have another letter upon the same general subject, that of winter feed for stock. It comes from A. H. Nichols, of Burlington, Iowa, who wants us to answer the following questions:

"1. Does corn and cob meal ever injure stock when well ground?

"2. Is there an instance, to your knowledge, that any kind of stock was ever killed by feeding corn and cob meal?

"3. How much it adds to the value of corn ground in the ear and fed to stock, over the western fashion of feeding in the ear and on the stalk.

"4. Is it best ground fine or coarse? Which is best, ground in the ear, or shelled and ground."

I answer, first, no; second, no; third, nobody knows; fourth, does any body know? I can only give my opinion, and it must be taken as an opinion based upon theory, not practice. I would give just as much for bass-wood rails as I would for corn cobs, to grind for any kind of stock. For hogs, I believe cobs are absolutely worthless. For horses, neat cattle, or sheep, I had rather have clean cut straw than ground cobs. As to grinding corn fine or coarse, it does not make so much difference, if fed immediately to the hogs. For any other purpose on earth, coarse meal is better than fine; and for human food, fine meal that has been ground a month is absolutely poisonous; it is not fit to eat.

Mr. Carpenter asked if any one here would answer this question.

Robert L. Pell.—I found that cob meal lessened the richness of the corn, and one animal fed with corn and cob meal did thrive better than upon corn alone.

Mr. Smith, of Ct.—Corn cobs weigh seven lbs. to the bushel, and some of my neighbors say it don't pay the extra cost of grinding the cobs, as it costs a quart more corn to grind a bushel of the cobs and corn together, than it does to grind the corn alone, so that in fact we give a quart of corn for seven lbs. of cob meal.

The Chairman.—I have ground a good many cobs, and have now thrown away my cob mill, and would not give one house-room. I cannot afford to grind cobs, nor to feed any grain unground; and I cannot afford to feed hogs uncooked meal. I cook meal six or seven hours, and I practice feeding it to hogs hot. The corn-cob has some value, but not enough to pay for grinding. We cannot grind cobs fine without great expense.

HUNGARIAN GRASS.

A letter from W. H. Skidmore, of Hawleysville, Conn., puts the following questions to the Farmers' Club respecting "Hungarian millet:"

"1st. What kind of ground is best adapted to its cultivation?

"2d. When should it be sown?

"3d. What quantity of seed per acre?

"4th. When cut, to be of most value for fodder?

"5th. Will timothy and clover seed take well with it?"

Solon Robinson.—I make answer as follows:

"1st. The very best Indian corn land upon your farm.

"2d. The fore part of June.

"3d. One-fourth to one-half a bushel.

"4th. Before the seed is fully ripe.

"5th. I think not; as it is a more rank feeder than oats, and shades very thick, and is a great exhauster of the soil."

Mr. Carpenter—I have tried this grass, and shall abandon it; it is not worthy of our cultivation in this section. It is a very coarse article, and exhausts the very best land.

Mr. Miller of New Jersey: The advantage of this grass is, that it may be sown in mid-summer, to help out the hay crop when it is likely to be short.

Mr. Smith—I have tried it one year, and gave it up. I prefer oats to millet.

The Chairman said that he had tried this millet until satisfied, and abandoned it.

Mr. Quinn, Prof. Mapes' farmer, of New Jersey, hoped that this Club would not indorse this humbug name of "Hungarian Grass," to a plant long known as German Millet. It is only worth cultivating under certain circumstances, such as do not often occur with farmers in this section. "Honey-blade Grass," is another humbug name for the same variety of millet.

FEEDING ARSENIC TO ANIMALS.

Robert L. Pell made a statement of an experiment with the use of arsenic, which he had found beneficial when fed to horses; but if once given, it must ever after be continued. It has a tendency to make the animal lay on fat, and look very sleek. It must be given with great care. It is taken in very minute quantities by some of the peasants of Italy.

Dr. Trimble objected to any recommendation of arsenic, except in the hands of a skillful physician. As a medicine for fever and ague, it has been highly recommended, and is an almost certain curative; but its injurious effects caused its disuse.

PEACH-BUDS IN NEW JERSEY.

Dr. Trimble, of New Jersey, exhibited a lot of peach-buds perfectly sound, and remarked that the cold must be 18° below zero to kill peach-buds in the early part of winter. It is not a long-continued cold spell, unless it is 17° or 18° below zero, that kills peach-buds, except after the buds start in the spring. When half the buds are killed, the crop is usually the best. There is no danger of the buds killing, or rather the peaches, after the blossoms have fallen.

Mr. Carpenter said that he had known the thermometer 30° below zero without killing the peach-buds.

R. G. Pardee corroborated this opinion. It is owing to location.

A gentleman thought the injury was done by a sudden and severe change.

Mr. Gore, of New Jersey, said that he saved his peaches once, by wetting the trees before sunrise after a hard freeze.

The Chairman said that a cloudy day after a frost upon corn, often prevented injury to it. A hot sun after a frost is sure to kill plants.

POTATOES—AN EXPERIMENT IN PLANTING POTATOES.

John G. Bergen, of Long Island, gave the Club the following results of experiments of planting potatoes at various depths, with seed from different parts of the tubers, with compost manure in the hill:

Experiment in planting potatoes various depths.—Variety, Mercer; planted May 12, 1859; dug Sept. 7; vines dead since the middle of August; planted one moderate size potato to each hill, and manured alike in hills.

		lb.	lb.	lb.	Average.
Two hills, 2 in. deep—each hill weighed separately,.		2	¾	..	1.375
Three hills, 3 in. deep—each hill weighed separately,		1½	1	1¾	1.416
Two hills, 4 in. deep—each hill weighed separately,		1¾	2	..	1.875
Three hills 5 in. deep—each hill weighed separately,		1½	1	1	1.166
Four hills 6 in. deep—each hill weighed sep'y,	lb2	1½	1¼	1¾	1.625
Four hills 7 in. deep—each hill weighed sep'y,	1¾	1½	1½	1	1.4375
Three hills 8 in. deep—each hill weighed sep'y,	1¼	1	¾	..	1.
Three hills 9 in. deep—each hill weighed sep'y,		1½	1¼	¾	1.166
Three hills 10 in. deep—each hill weighed sep'y....		1½	1	¼	1.25
Three hills 11 in. deep—each hill weighed sep'y....		1	1¼	1½	1.25
Three hills 12 in. deep—each hill weighed sep'y,....		¾	¾	1¾	1.083
Four hills, eye end cut, one piece, 5 inches deep, 5½ lb..........					1.375
Four hills, middle cut, one piece, 5 inches deep, 5 lb...........					1.25
Four hills, stem cut, one piece, 5 inches deep, 4½ lb.............					1.062
Two hills, one potatoe each, with plaster, 5 inches deep, 3¾ lb....					1.875
Two hills, one potato, plaster and ashes, 3¼ inches deep, 3¼ lb...					1.625
Two hills, one potato, ashes, 5 inches deep, 3¼ lb...............					1.625

It will be observed that the best results followed the 4-inch plantings; and next in order, 6-inch, 7-inch, 8 inch, and 2 inches; while 5-inch, which is between these numbers, (and which I think is the right depth for our soil,) produced less than any, until we reach the 8-inch plantings. The results are not uniform; for instance, one hill, 12 inches deep, produced 1¾ lb, which is larger than the average of any except the 4-inch planting; and so with other individual cases. The experiment is not conclusive, not being made on a sufficiently large scale, though carefully made. The yield was light in every case, but this was from other causes, and does not affect the general result. In all experiments of this kind, the size and quality, or condition of the seed, should be as near alike as possible. I deduce from these experiments, and from observation, the following, as bearing on this question.

"*First, time.*—The depth of planting potatoes should be varied according to the time of planting, and possibly acocording to the character of soils. Early planting, except to protect from freezing, requires the least depth.

"*Second, variety.*—Those that mature early, require the least depth. The habits of varieties differ, and the treatment should vary accordingly.

"*Third, season.*—Much depends upon the season, whether wet or dry, or medium. This cannot be known beforehand, and hence a medium depth should generally be selected. This, for early varieties planted early, and which generally mature on Long Island soils before severely affected by drouths, should not be over three or four inches, and for later varieties from five to six inches."

The potatoes experimented with were all of the Mercer variety.

HOW MUCH SEED TO THE ACRE.

This, one of the questions of the day, was called up, and Robert L. Pell, who is a very large farmer in Ulster county, New York, read a very interesting and valuable paper, detailing his method of seeding various crops, which we commend to an attentive perusal. It is as follows:

"To answer this question understandingly, we require to know the number of seed contained in a pound, and the number of pounds in a bushel:

	Seeds per lb.	lbs. per bus.
Italian rye grass contains	270,000	13
Red clover,	250,000	60
White clover,	687,000	61
Sweet vernal grass,	925,000	10
Drumhead cabbage,	112,000	52
Scotch drumhead,	127,000	55
Swedish turnip,	154,000	54
Buckwheat,	26,000	54
Rye,	22,000	56
Barley,	15,000	60
Wheat,	11,000	60
Oats,	21,000	32

The amazing number of seeds which many plants produce much facilitates their reproduction and wonderful multiplication. A single capsule of the common poppy contains no less than 7,500 seeds, a single stalk of corn 2,100, a single spike of the cat's-tail, typha major, 11,000, a single tobacco plant, 370,000, and a single stalk of spleenwort, 1,100,000. If, by any accident, all these seeds were placed where they could develop themselves, under circumstances favorable to their growth, the twelfth generation of any of them would seed the world. The structure of nearly all seeds is similar, every one is provided by nature with an external covering suited to its nature, which protects it from the excesses of moisture or dryness, and there is no seed with which I am acquainted that is devoid of this covering, usually called pericarp. "A scar will always be found on the pericarp, which marks the spot where nourishment entered while it was in the pod, through the umbilical cord. Nature has supplied every seed with the means of disseminating itself; with some the external covering opens with a quick spring, and ejects the seed to a great distance from the parent plant. The dandelion, thistle, and numerous others, are supplied with a feathery arrangement, which enables them to rise in the atmosphere, and diffuse themselves over creation. An important condition to the healthy germination of all seeds is, that they should have become perfectly ripened before being collected, as unripe seeds are not chemically combined, and therefore cannot germinate.

Another condition is, that they should not be sown too early in the spring, as no seed has ever been known to germinate below the freezing point.

"It is of the first importance in raising any kinds of crops, that the seed sown should be perfectly good, fresh, and thoroughly ripened. It is generally kept in shops for so great a length of time that it is often in a state unfit for vegetating when purchased by the farmer. I never sow any variety of seed until I test its quality in a hot bed, notwithstanding it may present a bright appearance, slide easily in the hand, smell sweet, &c. The proportion of seed that is necessary must of course vary according to the quality of the soil, preparation to which it has been reduced by the farmer, and its state of fertility.

"In rich, well disintegrated soils, every good seed grows, while in poor, badly tilled soils, be the seed ever so good, half of them will fail, particularly in dry seasons, and a third of those that come up will die afterward.

"Rich soils are supposed to require a smaller number of seeds than poor soils, as in the rich earth they have a much better chance of growing and becoming luxuriant, thus individually occupying greater space.

"In deciding upon the proper quantity of seed to be sown, the farmer must have regard as to whether the season is favorable or not, or he may meet with serious loss. I would, however, recommend on all occasions, a liberal allowance, though I have often found too great a luxuriance prejudicial from the fact that it retards the ripening process, and thus hazards the crop. I usually sow to the acre:

Wheat,	2½	bushels.	Red clover,	1	bushel.
Rye,	2¼	do	White clover,	0¼	do
Oats,	3	do	Timothy,	0½	do
Barley,	2¾	do	Red top,	0½	do
Bu kwheat,				0¼	do

"In my neighborhood, wheat is sown in October, and harvested 122 days after. Its vegetation is entirely suspended during the winter months. In Cincinnati, it is sown the last of February, and harvested in 137 days, under a mean temperature of 61 degrees Fah. I sow barley on the 1st of May, and cut in 93 days, under a mean temperature of 67 degrees.

"In high latitudes, vigorous vegetation in plants disappears, owing, probably, to the intensely cold winters, and want of heat in summer. The vine is most productive between the temperatures of 70 deg. and 80 deg. Fah.; wheat, 73 deg. and 75 deg.; barley, 69 deg. and 74 deg.; potatoes, 54 deg. and 75 deg.; melons, 66 deg. and 67 deg.; apples, 59 deg. and 72 deg.; tobacco, 66 deg. and 82 deg.; corn 59 deg. and 80 deg.; sugar cane, 71 deg. and 82 deg.

"The rapidity and growth of a plant after we have sown the seed, and the duration of its life, are, of course, affected by circumstances, on the knowledge of which, and the proper way to produce them, enlightened agriculture is dependent mainly. Over the natural conditions of the growth of vegetation we have little or no control; nor over the distribution of sunshine and rain, but artificial methods of accelerating growth are within our power.

"If, for instance, the season is backward, we may hasten the germination of our seeds by watering with a weak solution of chlorine, iodine, bromine, sulphate of iron, dilute sulphuric acid, or nitric acid, and the compounds of ammonia, and afterward, by the proper application of suitable manures, we may continue the development of all parts of the plant during the entire period of its growth, and thus increase, to an amazing extent, the return of seed.

"I once sowed 2½ bushels of wheat on a well-prepared acre of sandy loam ground, and it yielded me 1,600 pounds of grain, and 3,000 pounds of straw. On an acre of rich, stiff soil, abounding in organic matter and calcareous earth, thoroughly manured, on a pea crop, the same quantity of seed yielded 2,000 pounds of grain, and 4,000 pounds of straw.

"The grain was placed in dilute sulphate of soda for two hours, before it was sown, for the purpose of destroying the germs of parasites, which are apt to adhere to the kernels unless so treated.

"The quantity of wheat to be sown to the acre, is a matter of the very highest importance, and may be considered, first, with reference to the anticipated produce of a given quantity of land; and second, to the yield of the grain sown. There is no doubt but that by sowing thick, a larger yield will be obtained, than by sowing thin. East of the Alleghanies, on rich land, 2½ bushels yield 35 bushels to the acre, when 2 bushels will only yield 30 bushels. In Mississippi, rich lands, with 2½ bushels sown, yield 44 bushels; with 2 bushels, 40 bushels. In Venezuela, 2½ bushels will yield 44 bushels. In the environs of Paris, 2½ bushels will only produce 25 bushels. In England, on the best soils, 34 bushels. In Lombardy, on irrigated lands, 25 bushels.

"With regard to rye, I usually sow 2¼ bushels, and find it will thrive in nearly all soils, and in many that will not grow wheat at all; the return of grain is nearly the same average as that of wheat. From an acre of land producing 25 bushels, 54 pounds to the bushel, there would be reaped 1,360 pounds of grain, and 4,100 pounds of straw.

"On land of the same quality, where I only sowed 1½ bushels to the acre, my yield of grain was 1,000 pounds, and 3,000 pounds of straw.

"In the cultivation of barley, I usually sow 2¾ bushels to the acre, of the two-rowed *Hordeum distichon*, which yields 88 bushels, of 36 pounds to the bushel, or 2,394 pounds of barley, and 2,800 pounds of straw.

"The best season for sowing it is about the 1st of May, after some crop on which manure has been applied; it will not succeed a summer, fallow well; the best soil is a rich, finely pulverized loam. I usually sow it broadcast, but it will do better in drills. On a contiguous piece of land I sowed 1¼ bushels to the acre, and found great disadvantage in it — the season was dry, and few or no offsets were thrown off. The yield was 1,000 pounds of barley, and 2,000 pounds of straw.

"I take less pains in preparing land for oats than any other grain; it does well as a first crop on newly broken land, and succeeds best on a soil not much pulverized, sown after a single plowing as early in April as possible; from three to six bushels to the acre, according to the size and weight of the grain. If potato oats are sown, two bushels will always be ample, because it has no awns, consequently there is a greater number of grains in a bushel, and it litters better than any other oat. On medium soils, three bushels will be requisite, and on upland soils six will not be found too much. If an acre produce 2,260 pounds of oats, there will be 8,200 pounds of straw.

"This cannot be calculated upon always, because there is no grain grown that yields so variable a quantity of seed as the oat. I esteem it very highly as fodder; as it furnishes a large proportion of my winter food for stock. Its chief enemy is the wire-worm; and if you find the ground impregnated with the larvæ, defer plowing until May, when you will bury them so deep that the oats will grow beyond their reach before they can come to the surface of the ground.

"I usually sow four bushels of beans to the acre; and the yield is from 30 to 40 bushels, of 65 lbs. to the bushel. Four and a half bushels of peas to the acre yield from 30 to 80 bushels, of 64 lbs. to the bushel. The usual return from beans, as generally sown on poor land, is about 1,700 lbs., a little over 25 bushels; and of peas, about 1,000 lbs., a little over 15 bushels.

"One pound of turnip seed, mixed with two pounds of sand, will yield, on good ground, twelve hundred bushels of turnips, sown broadcast, provided they are judiciously thinned, and kept free from weeds.

"The carrot is much liked by cattle, but in my opinion does not possess the high value ascribed to it as food for stock by the generality of agriculturists. It requires a loose, homogeneous, deep, highly manured soil, and with care and attention will then produce 14 tons of roots to the acre, containing about 88 per cent of water.

"The parsnip in composition assimilates with the carrot, and will stand the winter in the open field. It is useful in fattening stock. I sow the seed of both these crops in drills without stint, and thin them when they come up, but have not kept an account of the quantity, as I raise my own seed, and always destroy those not made use of, unless a neighbor may require them, that I may never fail to have fresh seed.

"Of all the plants grown, the Jerusalem artichoke produces the largest crop at the smallest expense of labor and manure. A patch without care with throw out stems 11 feet high annually for thirty or forty years. It is propagated by tubers, and rarely, if ever, ripens its seed.

The potato thrives in many varieties of soil, provided they are rich and the climate is suitable. It should, like the beet, be planted in newly manured grounds, and be succeeded in the fall by a cereal crop. It must not be planted until all fears of frost have subsided. They may then be cut into sets and dropped into furrows 14 inches from each other, and two feet apart, and, as there is an intimate relation between the seed planted and amount of the crop, from 20 to 28 bushels of sets to the acre may be planted, according to the situation and variety of the soil.

"The yield, in Prussia, when 25 bushels are planted, is 5 tons; in Austria, when 25 bushels are planted, is 9 tons; in Flanders, when 25 bushels are planted, is 10 tons; in England, when 25 bushels are planted, is 10 tons; near Paris, in France, when 25 bushels are planted, is 11 tons; in Ulster county, United States, when 25 bushels are planted, is 11 tons.

"The potato, like all hoed crops, to produce good results, requires a great deal of care."

A long discussion followed this, many members criticising the quantity of seed that Mr. Pell finds profitable to use. He stated that his soil was a sandy loam, with a gravelly subsoil extending down a great depth.

Mr. Carpenter.—If corn is ever heated in the crib, its germination is destroyed. Great caution should be used in planting corn, when the earth is in the exact right condition of temperature.

John G. Bergen.—If beans are sown in drills, half the quantity named by Mr. Pell is sufficient. Peas are drilled, about 1¼ basket per acre. The quantity of grass and clover recommended is too large for our Long Island soil. So is the quantity of rye. I put only 10 or 12 lbs. of clover seed to the acre.

Mr. Pell.—My soil is a sandy loam. I have tried many test acres of different quantities of seed, year after year, and have come to the conclusion named. In regard to clover, I am well satisfied that a bushel of seed to the acre pays better than a less quantity.

The Chairman.—Much depends upon locality and soil in regard to quantity of seed. Mr. Pell uses much more than we do in Central New York.

R. G. Pardee.—The best Pennsylvania farmers use only 10 to 15 pounds of clover seed per acre, and it certainly appears to be a full seeding.

Mr. Pell.—It is possible that a portion of my clover seed decays, but if it does, it is the most economical manure that can be used. I have grown wheat plants upon a plot of grass, by the decay of wheat straw alone.

Mr. Quinn.—The quantity of seeds of all kinds named by Mr. Pell is entirely too much for New Jersey.

Solon Robinson enquired how he knew if he had never tried the larger quantities. In regard to clover seed, he said that he was satisfied that clover seed was the cheapest manure that a farmer could purchase, by the decay of the crop on the land.

The Chairman.—I knew a crop of 15 bushels of rye per acre grow on a field where the wheat was killed out. It is not likely that four quarts of rye were among that wheat, but it was enough to produce a good crop. I sow two bushels of wheat per acre. John Johnson sows but 1½ bushels. I sow 2½ bushels of oats, but the best crop ever grown in the State was from 5 bushels of seed oats, which produced considerable over 100 bushels per acre.

The same subject to be continued. The club adjourned.

H. MEIGS, *Secretary.*

March 19*th*, 1860.

Present 70 members. Mr. R. L. Pell in the chair.

Mr. Meigs read his translations and extracts.

A GRAND EXHIBITION OF THE INDUSTRY OF THE WORLD.

It is determined by the Society of Arts, of London, which originated the exhibition of 1851, to have a grand one in 1862, without reference to the state of the political world. A guarantee fund of £350,000 sterling, to be raised immediately. The building to be at Kensington, near the former location of 1851, on grounds bought with the surplus funds of that exhibition.

This Society of Arts is of greater magnitude than any other in the world. The society consists not only of London members, but of about *three hundred and fifty societies* in Britain, all co-operating. The Weekly Journal shows their daily transactions; they send us their numbers gratis. We invoke the attention of all the clubs and societies of the United States to that exhibition, for we have such confidence in the boundless ingenuity of our free people, that *we dare for precedence* anywhere on earth.

THE ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

The last volume of their Transactions is presented to the American Institute, and is received through the kindness of our minister, Mr. Dallas, free of all charge. We find a new and valuable article in it, on the turnip-cabbage: the *Cauli-rapa*, or *Kolu-rabi*, or *Rapo-caulis*, or *Caulo-rapum*, or *Rape-cole;* of which, there are several varieties, which I will give to the next meeting.

The microscope has been successfully used latterly in detecting adulterations of food and of medicine, which chemical analysis fails to find out. We recommend to those, who love such investigation, to consult the Micrographic Dictionary of Griffith and Henfrey, London, 1856. It is in our library. The engravings and wood cuts are over 800. The minute objects are magnified *several hundred diameters.*

EGGS IN FRANCE.

It is estimated in Paris, that France consumes, annually, nearly ten thousand millions of eggs. This would give to every soul of her forty millions, over 200 eggs a piece, old and young.

AN INSECT KILLER.

Joseph Fuller made a statement about killing grubs, worms and insects, in trees. The preparation is called liquid brimstone. He says it will prove a sovereign remedy against the worms in the roots of peach trees, and he thinks, too, that he can entirely prevent the yellows in peach trees. The application seems to be quite inexpensive, and Mr. Fuller thinks it is very efficacious for all kinds of tree insects. Part of the preparation is in the form of powder, and part in the form of a paste. He also thinks it a sovereign remedy against curculio, though he has not tried it fully. He recommends also, a solution of aloes applied to trees.

USE OF SHELLAC IN PRUNING.

Take an ordinary glue pot, which is in a water-bath, and put therein one part of spirits of ammonia (hartshorn) and eight parts of water; bring them to nearly the boiling point; put in shellac gradually until the whole is about the consistency of varnish, stirring all the while; when entirely dissolved, take it from the fire, and continue stirring until it is cool; then bottle, and keep for use. This makes an entirely water-proof coating, and in summer pruning may be applied to the ends of the limbs with decided advantage.

For all trees that exude gum, like the cherry, peach, plum, and many forest and ornamental trees, it is extremely useful when applied to all wounds and cuts, as it keeps out the water and allows the wood to heal quickly.

Shellac cannot be dissolved in water alone. The ammonia in the mixture dissolves it, and afterward evaporates, leaving nothing but shellac and water, which cannot in any way be injurious.

I think seed-lac is about as good; it is certainly cheaper.

Wm. S. Carpenter.—This mixture forms an elastic covering, which is much better than shellac dissolved in alcohol.

Joseph Fuller.—This preparation must not be made in an iron kettle. It will not mix well. Use copper, zinc, or tin.

GRAFTS.

Mr. Carpenter presented grafts for distribution, among which were those of the Vermont Golding and Vermont Beauty. He also stated his manner of marking grafts. Cut notches in the grafts, and then register them by the numbers, each notch counting one.

HOT WATER UPON TREES.

Solon. Robinson read a letter from the Rev. J. S. Weishampel, sen., Baltimore, Md., upon the use of hot water to kill insects upon trees. He alludes to a letter read here some weeks since, about scalding wheat, and then says:

"This scalding process destroys the egg of the fly, and the same process has been known to destroy the eggs of, and the grubs themselves, that injure the peach, plum and other trees so greatly. Scald the stem of the tree well, letting the hot water get well into the ground around the tree, where the grubs do most harm, and a destruction of both eggs and grub follows; and, in addition to this, the scalding appears to add to the vigor of the trees.

"An old lady in Berks County, Pa., had a plum tree that for many years bloomed and brought forth crops of fruit till half ripe, and then shed them. She often besought her husband to remove the tree, but he still pleaded "let it stand another year." At length one spring, after she had boiled her soap, she heated the kettle full of the refuse ley to a boiling degree, and poured it all down the stem of the tree, intending to "scald it to death," as she said. It soon blossomed more abundantly, and bore a profuse crop of plums, which it brought to the greatest perfection.

"This same principle could be applied to the destruction of every kind of destructive insect upon the various choice fruit trees, either by pouring boiling water upon the limbs and stems, or by conducting a stream of steam from a hose or pipe, from a movable boiler, to kill both eggs and insects.

"Chestnuts, too, are very liable to be worm-eaten. If they were subjected to a momentary heating (wet or dry heat), to a sufficient degree to scald, it would destroy the germ of the worm that destroys that sweet nut. And the same principle would also prevent all wood used in building and machinery from becoming worm-eaten."

Prof. Mapes.—I have used hot water on peach trees, and satisfied myself that a peach tree cannot be injured by hot water.

Mr. Carpenter said that lime was the best thing he ever tried around peach trees.

Mr. Wheeler said that lime will not kill the grubs in the wood.

Mr. Smith, of Lebanon, Connecticut.—I have found no remedy except manual labor, though wood ashes are valuable, and so is lime. I have an orchard in full bearing, that is fourteen years old.

Prof. Mapes.—I have never found any remedy equal to hot water. It cooks the worms.

MOLES.

A letter upon the subject of moles, was read, which elicited a lengthy discussion.

This animal, says the letter, as you probably know, has a very small apology for eyes, which cannot be discovered till the skin is removed; and it cannot be ascertained that they are of any practical use. His sense of hearing and of smell is very acute, and he is enabled to elude observation, and to avoid anything unusual that may be placed in his track. No device, however, with which I am acquainted, will force him to abandon a well cultivated tract abounding with earth worms, which are his chief attraction. He will pass from hill to hill, severing the corn, melon, or other seeds from the tender plant, thus greatly impeding its progress, and in many instances wholly destroying it. In a scarcity of earth worms, he will prey upon beets, potatoes and other roots, with voracity; still the damage he thus does, is of little account compared with that produced by his relentless plowing or rooting. Where the soil is fertile and not too wet, this intruder will be found undermining all vegetation, and is a source of discomfort to the agriculturist, which must be realized to be appreciated.

"Failures in field and garden, which are often attributed to drouth, or insects, are many times produced in a great measure by moles. At morning, noon, and evening, the mole goes forth on his depredations, making the most rapid movements, (for an undergound performance), and in less than twenty minutes finishes his repast, and returns again to his hiding place deep in the earth beyond the reach of all intruders.

"The Yankee mole is too shrewd for the English trap, or, indeed, for any, with a single exception. I have examined several traps, beautiful in theory, but they are splendid practiced failures."

Wm. S. Carpenter.—I am satisfied about the injury of moles to the farmer, being much more than all his benefit in eating worms. I had a bed of tulips destroyed by moles. I traced them by their paths from root to root.

Prof. Mapes.—I have tried careful experiments with moles in confinement, and have never succeeded in getting them to eat any kind of vegetable matter.

Mr. Moody, of New Jersey.—I have found that moles do cut off the stems of thorns in my hedge. I cannot say that they eat thorns. I am satisfied, too, that they will eat potatoes.

Prof. Mapes.—I find that potatoes are eaten in the vicinity of moles, but I am satisfied that they are eaten by grubs that the moles feed upon.

Dr. Trimble.—The potato is eaten by the grub of the cockchafer, and not by the mole.

Mr. Fuller.—I have known moles to gnaw potatoes, but not for food.

The Chairman made the following remarks upon this subject:

MOLE HILLS.

In rich alluvial soils, mole hills are thrown up in immense numbers, because such soils usually abound with the food that these subterraneous creatures seek for. They destroy the roots of grass immediately contiguous to their mounds, beside often impeding the free action of the scythe, for these reasons. Some think it well to exterminate them, still they, no doubt, do a vast deal of good by destroying obnoxious worms and grubs. In the spring of the year it is an easy matter to spread out these mounds over the surrounding ground, as they are dry and powdery, and act, to a certain extent, as an enriching top dressing.

The mole cannot bear access to the atmosphere, being wholly subterraneous by nature; they never drink, but live entirely upon worms, insects, and the roots of grass, and are never found in gravelly or clay soils. They breed in April and May, and generally produce four at a birth. The tunnels that they make are invariably parallel to the surface of the ground, and about six inches deep, unless they become alarmed, when they immediately sink to the depth of fourteen inches, rarely deeper. They have cities under ground, which consist of houses, or nests, where they feed and nurse their young; communicating with these are wider and more frequented streets, made by the perpetual journeys of the female and male parents, as well as many other less frequented streets, with diverging branches, which they extend daily to collect food for themselves and families.

Moles are exceedingly active in April and May, during the pairing season, when the tunnels become very numerous, for the purpose of meeting each other. I do not believe that they are blind, from the fact that I have never observed that the mole-hills increase except in the day-time, showing that they do not work by night, which they would probably do if deprived of sight. They commence very early in the morning, when you may often see the mould, or grass, moving over them; you may then readily cut off their retreat, by thrusting in the ground a spade directly behind them, when they may be dug out very easily and killed by the attendant terrier. By placing your ear on a newly-raised hill, you may hear them scratching at a considerable distance, and thus be able to find them. You may always discover the locality of their young by observing the hills which are larger and the color different, a portion of the sub-soil being thrown upon top. If you desire to set traps in their tunnels, it will be necessary to discover which are the frequented streets and which the by-roads.

This may be accomplished by pressing the foot lightly on the hill, and if the mole passes that way he will nearly obliterate the mark. You may then set a subterranean trap, and he will be caught. These may be made from a piece of wood, in a hollow, semi-cylinder form, with grooved rings at each end, in which are placed the nooses of horse-hair, one at each end, fastened by a peg in the centre, and stretched above ground by a bent stick; when the mole has passed through one of the nooses, and removed the central peg, the bent stick, by its elasticity, rises and strangles the animal. The structure of this quadruped adapts it admirably to the underground life that it leads. Its head is very long, conical in shape, and tapers to the snout, which is much strengthened by a bone, gristle, and very powerful muscles. The body is cylindrical, very thick on the back of the head, from which it diminishes to the tail. It does not appear to have any neck, but where it should be, there is a mass of muscles, all of which appear to act upon the fore legs and head. These are the instruments with which he excavates the ground; they are harder, shorter, and stronger in proportion to the size of the animal, than in any of the mammiferous class.

I have never destroyed one of these little animals, because I consider the damage they do to a few roots of grass is entirely counterbalanced by the immense destruction by them of wire-worms, slugs, &c., besides aerating, disintegrating, and lightening the soil, and thus fitting it admirably for the purposes of top dressing.

I never permit the common crow to be destroyed, because he preserves my corn-fields from numerous enemies, keeps off hawks, destroys slugs, snails, grubs, and eats carrion. Nor the black snake, whose constant employment seems to be the destruction of field mice, and other enemies to the orchard. Nor the cherry bird, because he is always on hand ready to eat the first cherries that ripen prematurely, which invariably contain the worm. Nor the king bird, wren or robin, all of which are employed from dawn to dusk in relieving me from my enemies.

PRUNING AND TRANSPLANTING TREES.

Mr. Wheeler.—I have adopted the latter part of November as the best time to trim the most kinds of trees and vines.

Thomas Cavanach, gardener, Brooklyn, read the following paper upon pruning:

"In transplanting two very important things are to be considered: first, preservation of the spongioles of the roots; second, the prevention of evaporation. The next important part is to choose that season when the tree or plant, according to its kind, is either losing its sap in a state of repose, or just before sap commences to start for another season, each has its advocates; every tree, even of the same species, will not admit of transplanting at the same time, and it will therefore depend much upon the judgment of the planter. The majority are in favor of early autumn planting, but this has reference to the state of the plant as well as the state of the season. Small trees and plants may be moved with less chance of failure than large ones, because their fibres are less liable to injury than small ones. Large trees and shrubs cannot be removed without injury to their roots, and at their ends, the very parts of most importance to them, because there the spongioles are situated, and these, if once destroyed, must be reproduced before the plant can derive any nourishment for its future support. Trees removed in the fall will have these organs the soonest produced, and in the spring the latest, if at all in the later case, the trees are left without support at the very time they most need it, and in consequence the leaves wither, the tree dies, or becomes greatly injured. The state of the weather has much to do with the successful removal of all trees. Dry, windy and frosty weather, as well as very warm sunshine, is the most unfavorable of all; evaporation goes on more rapidly in such states of the weather than at any other time. A mild, damp day is the most fitting for the operation of transplanting, and this will be greatly enhanced if mild showers fall during the night, when evergreens are removed in a growing state, the moisture surrounding the roots is absorbed, and at once assimilated as food for the plant. The wounds where the roots have been injured quickly heal over, and new roots are formed; but if removed in winter, when the ground is frozen and the tree in a dormant state, the moisture which surrounds the roots has a tendency to rot the portion of the roots where they have been severed. In planting fruit and forest trees, autumn is undoubtedly the most proper time. The wounds made in their roots will commence to cicatrize and throw out granulous matter, and sometimes even spongioles immediately, so that by the time spring arrives the tree will grow with almost as much vigor as if it had not been transplanted. The next thing of importance is the preparation of the ground. Many ignorant persons plant trees much in the same way as we would set up a post in the ground, under the mistaken idea that a tree, when it is placed in the soil, will grow under any circumstances. No tree should be planted in a hole less than four feet square and two feet deep. The bottom of the hole should be well loosened, and a compost of leaf-mold and manure mixed with it; in planting, care should be taken to cut off all bruised or broken roots; in filling, the soil should be finely pulverized and worked in among the roots, and the tree gently shaken up, so that the soil may reach every root. A tree should never be moved backward and forward, as every pull you give it draws the roots out of their place, and causes them to become doubled up, thus defeating the very object you had in view when you spread the roots; great care should be taken in treading in the soil, for if not properly filled in, the roots are very apt to be broken off. Avoid deep planting; more trees are lost every year from this cause than from any other. No tree should be planted more than a couple of inches deeper than it was before. Mulching trees after transplanting is a very useful practice; in winter it helps to exclude frost, and in summer prevents evaporation of moisture, and prevents the roots from suffering from drouth. In pruning the heads of trees before transplanting, much will depend upon the size of the tree; large trees require more pruning than small ones. It needs but little judgment to enable the planter to ascertain how much of the top it is necessary to prune in order that the loss may be equalized between the branches and the roots. The poor success attending the transplanting of the large trees in the Central Park of this city, may be attributed to the fact of their not having been pruned; if one-third of their tops had been taken off, the result would have been different."

Mr. Carpenter is opposed to fall pruning. He said: I have practiced a good deal of pruning of apple trees in summer, and have been much the most successful. In planting trees (apple or pear), I dig two feet deep and six feet wide, and fill the hole with good soil, and set the tree nearly level with the surface, and never use manure. I make the earth very fine, and am careful in setting them. In budding pears upon quince, set them on very short stalks. A dwarf pear set upon a quince stalk a foot high is almost worthless.

Prof. Mapes.—I dig pear tree holes four feet deep and four feet wide, and I bore a post auger hole in the bottom of the hole. I don't put back the subsoil into the hole, but fill it with surface soil, and never use any putrescent manure. Out of three thousand dwarf pears set upon my place I have never lost one; and I always plant the tree low enough to cover the joining of the pear and quince, so that the pear makes roots. I set my trees six to eight feet apart in the rows, and the rows twenty feet apart. I never let my trees grow over six feet high, and always raise crops between the rows, plowing very deep. My trees are always healthy, and my Dutchess d'Angoulême trees average 200 pears to a tree, all large. I use about a pint of soluble phosphate to a tree, once a year. Burnt bones, without sulphuric acid, is almost valueless, as a tree manure. Bones with the gelatine in them, ground, is not a good manure for pear trees. I mulch with salt hay in summer, and take it off in winter. A pear tree needs a great deal of moisture, and that is found by mulching. But the mulch must be taken off in the fall, to check growth, and prevent winter blight.

In regard to treatment of peach trees, care should be first taken to plant the seeds in the right position, which is always point end downward. In trimming peach trees our best growers trim the young stalk to a straight stick, so that it will put out branches evenly all round. In transplanting be careful never to set the tree below the cotyledon. In trimming, do it in spring, and shorten in two kinds of the new wood the first and second year; and don't cut next to the double buds. Make your trees stiff in the limbs, so that none bend over like a willow when in fruit. In Jersey, after trees have borne four crops, they are given up and new ones set. Some of the large peach orchards are very roughly planted in Jersey. But I would plant peach trees just as I do pear trees, in four foot holes. I would prune grape-vines in the fall, in all cases, so far as possible. The middle of November is the right time. The cuttings may be kept in a cellar or in dry soil. The best way to prune pear trees is to pinch in the buds in summer.

Adjourned.

H. MEIGS, *Secretary.*

March 26*th*, 1860.

Present sixty members. Adrian Bergen, of Brooklyn, in the chair.

The Secretary read the following translations and extracts from foreign and domestic works received by the institute, since the last meeting, viz:

We have recorded in our transactions of 1859, the illustrious act of Victor Emmanuel, King of Sardinia, in clothing his hills and mountains which have been naked of trees at least *one thousand years*, with *five million of trees!* We deem this a truly royal paternal act, and we send him our volumes and a note of high respect, viz:

(*Copy.*)

UNITED STATES OF AMERICA, STATE OF NEW YORK,
CITY OF NEW YORK, AMERICAN INSTITUTE.

Sir:—We have recorded in our Agricultural Transactions, published by our State of New York, the noble and royal acts of your Majesty, in replacing with new forests, those long lost on your hills. We are charmed with the act, as one of *magnificent good* to millions, and as claiming even in America, yet *so nobly forested* our admiration.

Be pleased to accept our volumes and the most sincere assurance of our profound respect. We salute you hoping that political trouble may not disturb your paternal care of the vesture of your mountains and plains.

For the American Institute,

Your Majesty's ob't sev't

H. MEIGS, *Recording Secretary.*

VICTOR EMMANUEL, *King of Sardinia.* (79 years of age.)

THE OLIVE.

Its oil, in general, is superseded by our butter, but is on every well set table, and in constant use on all our salads. We ought to raise enough in *some of our climates*, for we have all, for home use at least.

The best account of this valuable tree is found in the *Farm Book* of France, "Maison Rustique Du XIX century, a work now, from the beginning, a 100 years, adapted to all French farming. We translate from it, for we do not find *enough said* about it in any other language.

"*Olivier*, in Latin, *Oleo;* English, *Olivetree;* in Italian, *Ulivo;* in German, *Oelbaum*. There are now known 16 or 17 species, all exotic to France. It is a tree ordinarily from 20 to 25 feet high, in the south of France, but in Southern Spain, Italy, Africa and East Indies, often more than double that size. Generally, the main trunk rises hardly to ten feet, then branches off, forming a multitude of smaller ones, and usually a kind of regular rounded head. The leaves are coriaceous, (leathery) lance-shaped, green above and silvery white below; flowers small; white; in bunches; one or two only give olives. It flowers in May or June, and the olives are ripe in November.

The varieties are thus described by Favanti. It was a very celebrated ree in ancient days. It is first named in Genesis, after the deluge, a branch of it being brought by a dove to Noah, while he was still in the Ark. Minerva, the Goddess of Wisdom, intending the most useful gift to man, struck the ground with her lance and up came the the olive! All antiguity it was deemed a sacred tree. Cecrops, the founder of Greece, established it first in Attica! or as some say, by Hercules. who planted it on Mount Olympus. It was the crown of Grecian heroes, and at the same time the emblem of peace among all ancient nations.

The Romans did not permit it to be used for any profane purpose; *they never burned it* except as an incense on their altars' Columella, 1800 years ago, says "Olea prima omnium arbovum est," (it is the first of all trees). The Phenicians carried the oil to Spain and exchanged it for bars of silver.

The Phoceans first took it to Gaul, where they founded the city of Marseilles, nearly 2500 years ago. Tarquin, the Proud of Rome, got it a 100 years afterwards. Humboldt says it abhors all extremes of climate. *Scarcely any tree has so many ways of propagation. A limb cut into slips, divided roots*, the *bark* in fragments, *shoots* at the feet of old trees. *Layers, the pits.*

The *thrush and the blackbird* fill their crops with these olives, and generally drop them under the shelter of some rock or bush, where they eat the pulp and drop the pit. Our orchadists find the young trees in such places and transplant them to their orchards, taking up with the roots as much earth as possible. The olive tree is a slow grower. Hesiod (older than Homer,) said that no man ever eat the fruit of one he planted. The tree will show feeble fruit in 10 or 12 years, but not good till 25 or 30 years of age. The trees must be set in ground deeply and thoroughly tilled. The tree will take every kind of graft; budding seems best. The best trees are grown from seed, and varieties are obtained.

The ancient olive tree, now or lately alive, measure, some of them, *thirty six feet in circumference*! Those on Mount Olivet, are believed by many learned observers, to have been there in the time of our Saviour.

H. MEIGS.

We quote the "Year Book of Facts in Science and Art," just received by the Institute from London:

THE GENETIC CYCLE IN ORGANIC NATURE, BY D. G. OGILVIE.

"Parental derivation, D. Ogilvie observes, is now generally allowed as the *sole origin* of organic beings; and the subject of discussion among yhysiologists, is no longer the admissibility of *spontaneous generation*, but the nature of its derivation, as the case may be, from a single pair or parent. The former mode of origin, by what was called "*Gemmation*," or the "budding process," plays a very conspicuous part in the propagation of many of the lower species; and by its periodic recurrence, in conjunction with the other form of reproduction, gives rise to the singular phenomena, known as alternations of generations. Three stages are distinguished in the Life-History, the protomorphic, (first form,) the orthomorphic, (right form,) and the gamomorphic, (marriage, sex, &c.,) the *reproductive organs*, gemmation may be interpolated. As examples of the former, the trematode and eystic entoroa were referred to in the animal kingdom, and the mosses among plants, and let us examine.

RESPIRATION OF PLANTS, BY M. TRAUBE.

1st. Plants absorb oxygen not only during germination, but during every period of their growth, even in sunlight.

2d. It is absolutely necessary for them; without it they perish.

3d. The oxygen they absorb in darkness, is always converted by them into carbonic acid. This also occurs in day, but is then difficult to detect, owing to its decomposition by the green parts of the plant.

4th. They respire like animals, breathe out carbonic acid, and breathe in oxygen.

5th. They have no special organs of respiration.

6th. The most important product of plant respiration is *cellulose*, the result of a hydrated carburet, dextrive, glucose, &c.

7th. The principle functions of respiration in plants is the organization and elaboration of the nourishing sap, which depends on the presence of *cellulose, which is completely independent of solar light. Plants, like animals, are developed in darkness!*

8th. The vertical direction, seen in the developement of young plants, also has no connexion with solar light.

[*Transactions of the Academy of Science, Berlin.*

Royal Agricultural Society of England, 1860, consists of 79 life governors, 128 annual governors, 933 life members, 4082 annual members, 18 honorary members. Its funded property is £10,000 in the new three per cent stock. Its late Secretary, Mr. Hudson, was dismissed for embezzlement of its property. Mr. Brandreth Gibbs is now honorary secretary. But Mr. Henry Hall Dane is secretary elect, with a salary of £400 *sterling, and house, fire and light.* An editor of the Society's journal is to be appointed, with a salary of £500 sterling.

At their last cattle show, at Chester, they received for admission over £6,000 sterling. Expenditures, over £9,000 sterling.

At Warwick, receipts, £5,461. Expenditures, £7,468.

How is this? Our losses by the terrible conflagration of the Crystal Palace and other losses, did not come near this last of over £4,000, sterling, $20,000.

John C. Morton, on Agricultural Maxima, is a good essay on the extraordinary crops and animals occasionally found.

GRASS.

Near Ayr, Italian rye grass on copious manures and flooding, guano, ammonia, 100 tons of water on an acre. Four bushels of seed per acre in autumn, brushed in. First cut in June, 10 to 12 tons, then 300 to 400 lbs. of mixed Peruvian guano and sulphate of ammonia, washed in by 100 tons of water, in which also are the dung of 48 cows. In five weeks cut 3 feet high 16 to 20 tons per acre, then a like manuring, and the third cut in September of 16 to 18 tons, and in October 10 to 12 tons more. In two years 7 cuts yielded from 80 to 100 tons of green grass.

The record of the results of drainage are very valuable.

THE EXPERIMENTS IN TOP-DRESSINGS FOR WHEAT, BY PROF. VOELCKER.

One conclusion is given, viz.: "That all artificial manures, such as nitrate of soda, guano, or a mixture of nitrate of soda and salt, should not only be passed through a *fine sieve*, but they should also be mixed with from *three* to *five* times their own weight of fine *red ashes*, dry soil, or sand, before sowing them broad-cast by hand, or what is better and more convenient, by the broad-cast manure distributor. That made by Chambers, or that by Reeves, cannot be too highly recommended for uniform, even and expeditious sowing of these top dressings.

THE WATER DRILL

Works well, watering the plants in their drills with the liquid manures. Reeves' new machine does it well. It is an improvement upon Chambor's

SORGHUM SACCHARATUM.—CHINESE SUGAR CANE.

By Prof. Voelcker.—Analysis of plants of five feet high from the farm of the Royal Agricultural Society, at several periods of its growth. *No sugar in it in August, but in September*, 32 *per cent. in dry canes.*

Mr. E. Merriam, the meteorologist, of Brooklyn, introduced the Princess of the Ojibway, alias Chippewa nation of Indians, who is about visiting the Queen of England. She spoke eloquently of the success of her nation in the pursuits of civilization, schools, agriculture, &c., and was applauded by all the members of the club. Her name is *Nah-nee-bah-nee-qua*, (meaning *a good woman.*)

All concentrated manure, such as guano, phosphate, &c., should be dissolved, or sifted, lumps made fine, and mixed with coal ashes, or some other divisor.

SORGHUM,

Being analyzed in August, showed no sugar, not even a trace. The same cane, when dry, in December, gave a large percentage.

WILD POTATOES.

Mr. Merriam made a statement that common potatoes grow wild in Tennessee. He also alluded to a valuable kind of wild grass growing in that State.

SOLUTION OF ALOES FOR INSECTS ON PLANTS.

Mr. Peter S. Titus read an extract from a letter of Dr. Euler, of Pennsylvania, upon the use of solution of aloes to destroy insects upon plants. It states that Mons. Raspail, of Europe, an eminent chemist, recommends the aloes very highly, its application being exceedingly successful. It destroyed the aphis on apple and peach trees, and prevented the attack of curculio upon plums. In some applications, where a plaster is necessary, wet clay with a solution of aloes, and it will destroy all insect life it is applied to. It is suggested that watering roots will embitter the foliage so as to prevent the attack of insects. It is also suggested that seeds steeped in aloes water will save it from all attacks of insects. Put three ounces of aloes into 145 gallons of water for a steep for seeds. It is an effectual preventive of rose-bugs and melon-bugs. Mr. Titus applied a strong dose—an ounce to two gallons of water.

INDIAN AGRICULTURE.

The Ojibway princess, who was present, was invited to the platform by Wm. S. Carpenter, to state some of the modes of cultivation among her tribe.

She said that christianity had been successful in so far civilizing the Indians, that many of them had become good farmers, and are living like white men. She said that the poor Indian is not so encouraged as the white men to make improvements, but still they are progressing. She then stated that they had taken the wild rice from Rice lake, and sowed it in wet places near their village, where it has successfully taken root, and after about three years from the sowing, it produces a good crop. Her talk was very interesting.

A NEW FERTILIZER.

Dr. Nab, of Vermont, stated that things poisonous to insects are sometimes food for animals. So this is the case with plants. He mentioned an experiment, made in North Carolina, with crude turpentine as manure for corn, which proved eminently successful. This was upon the soil that produces the turpentine. He also spoke of the great want of proper tools in all Southern countries, both in the United States and in Central and

South America, and the rude way in which land is cultivated. In the course of his speech, he alluded to the practice on Long Island of drilling corn, which he thinks a bad one, because the soil is not strong enough to grow a crop in that way.

The Chairman stated that corn for a grain crop is almost always planted in hills on the island; that seen by the doctor was probably planted solely for a green fodder crop.

NEW SEEDLING POTATOES.

The Secretary read the following letter in relation to a new seedling potato, a bushel of which was sent in for distribution among the members of the Club:

No. 308 BROADWAY, *March* 26, 1860.

The Hon. HENRY MEIGS, *Sec. Farmers' Club Am. Institute:*

Sir—I have the pleasure of presenting, for distribution, three specimens of seedling potatoes, the production of Mr. D. A. Bulkeley, of Stone Hill Farm, Williamstown, Mass. He has named the lot: No. 1, Black Swan; No. 2, Blue Nose; No. 3, Bulkeley's Seedling. Mr. B. has for many years been engaged in raising seedling potatoes. The "Stone Hill," well known in some sections as an excellent and very early variety, is one of his seedlings. In his letter to me, he says of the Bulkeley's Seedling: "They are the first I have ever consented to have bear my name, out of the thousands of varieties I have raised. The last crop of them, the fifth from the ball, was 544 bushels per acre. They took the first premium at our county fair, and wherever else exhibited. Added to their productiveness, they are a very *smiling* potato when cooked." While he considers this the best of the three, he says the others are tip-top, and no mistake.

Yours, S. R. WELLS.

INCREASE OF FRUIT CULTURE.

Solon Robinson.—The increase in fruit culture is so evident this spring, that there is reason for hoping that some of the present generation will live to see America produce as much fruit as the people require. Of grapes, the prospect is that a greater number of persons will plant vines this spring, than in any previous year. Dr. Grant's orders are so very large, that it requires all the force he can apply to put up and forward the vines ordered; the largest portion being for the Delaware. I hold in my hand a letter from Charles F. Erhard, of Ravenswood, L. I., one of the largest and most successful propagators of the cherry currant, and also a grower of one of the best summer pears, a new seedling that is well worthy of being better known. This letter states that he cannot fill orders for cherry currants; that all the stock grown in 1859 was exhausted early in the fall, and he now has orders for as many as he will be able to grow this year; one of these orders in advance is for ten thousand plants. Mr. Robinson called upon Mr. Fuller to corroborate, if true, his statement as to the increase of fruit-growing.

Andrew S. Fuller.—On a recent tour in the country, I could have sold

50,000 cherry currants if I had had them, or could get them anywhere in this country or Europe. There is a great demand for all sorts of small fruits in the west. But there is also a great deal of ignorance in planting and handling trees. I saw piles upon piles of trees on the quay at Cincinnati, with the roots all exposed to the sun and wind. At Alton, I found men planting acres of small fruits, grapes in particular. They are willing to pay $5 apiece for good Deleware vines. In Missouri, the culture of grapes is increasing beyond all calculation. At Cincinnati, the grape growers are trenching the land five feet deep, turning the soil down to the bottom, where the roots find it. If the soil is very rich on the surface, the roots run upon the surface, and in hot weather the vine and fruit suffer. The Isabella at the west, has lost favor with all wine makers; and the Catawba is certainly destined to give place to a better grape. At a late meeting of the wine makers association, at Cincinnati, there were 27 bottles numbered and not named. That pronounced best was afterward found to be the Delaware, and Herbemont the second best. The German style of pruning and training is in the highest favor at Cincinnati.

Wm. S. Carpenter.—The fruit crop in this country is largely on the increase; not only small fruits, but tree fruits of all sorts, and particularly pears. A good crop may be had from dwarf pears in three or four years from planting. A few years ago, William Reid had a little spot on Murray Hill, in this city, then called a large nursery, but it soon became too small, and he removed to New Jersey, and now has fifty acres, and his orders are so great that he cannot supply them. His stock is principally dwarf pears.

At Rochester, there is a nursery of 600 acres. Still there is no danger of overstocking the market for trees or fruit. A few years ago, a man could not sell three barrels of Bartlett pears by the bushel in this city, but had to divide and sell them by the basket.

Mr. Fuller.—A man at New-Haven has proved that he can afford to expend a thousand dollars an acre upon poor, sandy land, for the cultivation of small fruits. He digs three feet deep, and mixes manure all through. He grows pears and strawberries together.

VARIETIES OF PEARS.

Wm. S. Carpenter, recommends the following named pears for cultivation in this vicinity. His place is 27 miles north-east of this city, and all of the sorts named grow perfectly with him:

Pears on Pear Stock—Summer.

Select list of Fruits.—Doyenne d'Ete, Beurre Giffard, Dearborn's Seedling. *Autumn*—Bartlett, Doyenne Bossock, Flemish Beauty, Seckel, Beurre d'Anjou, Sheldon. *Winter*—Beurre Diel, Laurence, Glou Morceau. *For Cooking*—Vicar of Wakefield. *Pears on Quince Stock*—(For twelve varieties)—Doyenne d'Ete, Glou Merceau, Flemish Beauty, Vicar of Wakefield, Buffum, Beurre Langelier. (Six varieties on quince)—Tyson, Louise Beurre de Jersey, Duchess d'Angouleme, Urbanist, Belle Lucrative, Beurre Diel.

List of Apples.—*Summer*—Large Yellow Bough, Early Harvest, Red Astracan and American Summer Pearman. *Autumn*—Jersey Sweeting, Poster, Hawley, Gravenstein. *Winter*—Rhode Island Greening, Hubbardston, Nonsuch, Baily Sweeting, Baldwin.

Geo. Geddes, of Onondaga.—I saw in Mr. Yeoman's garden, in Walworth, Wayne county, Virgalieu pears so badly cracked as to be utterly worthless. This is due to something in his soil. A third of an acre of the Duchess d'Angouleme, produced a crop that sold for $500. One barrel full contained only 168 pears. Dwarf pears in Western New York are about being cultivated very extensively. I failed in my first effort, but I have found that I can grow dwarf pears successfully, and am going to plant 4,000 trees this spring. I dig my holes for pear trees all over the lot; that is, I dig all the land very deep.

Mr. Fuller objects to recommending the Glou Morceau pear; it is not generally successful.

R. G. Pardee.—Mr. Yeomans trenched and prepared his land for pears, in the best manner, and planted at first 5,000. His first stock was principally Virgalieu, and all failed to produce good fruit, while in all the country around, the same sort succeeded well. Bartlett's also cracked badly, from some deficiency in the soil. As a rule, never use coarse, unfermented manure upon any fine, fibrous-rooted trees. It is much more important to dig the soil well, than it is to apply manure, in the cultivation of fruit.

John G. Bergen.—In regard to the Bartlett pear cracking, I am sceptical. I think that the universal testimony is in favor of the Bartlett growing sound, and I think that Mr. Pardee must have been mistaken about this sort cracking at Walworth.

Mr. Pardee explained that the Bartlett does often fail upon the quince stock, but not upon pear stocks.

Mr. Doughty, of New Jersey, referred to a very marked failure in that State, of the Bartlett upon quince stocks, and a great success upon the same spot with the Bartlett upon pear stocks.

Mr. Geddes.—I found in Mr. Yeoman's trees, that at the point of juncture of the pear-scion and quince stock, they were of the same size. I attribute this to the fact that the trees were planted so deep that the joint is beneath the surface of the ground, so that roots can start from the scion as well as from the stock.

All persons present agreed that it was important to plant dwarf pear trees from one to four inches below the graft.

Subject for next meeting: "Corn Planting, Spring Planting and Pruning." The Club adjourned to next Monday.

H. MEIGS, *Secretary.*

Monday, April 2, 1860.

Present 56 members. Robert L. Pell, of Pelham, in the chair.

INFLUENCE OF ELECTRICITY ON VEGETATION.

By H. Meigs.—The earth is dependent upon the heavens in all its animal and vegetable forms. A farmer studies the *weather* as much as a *seaman*. Deeply interested are both of them relative to their vocations.

We deem it proper to note the extraordinary display of Aurora Borealis on the 28th of August, 1859.

I observed the whole of it, and marked the peculiarity of its center of radiation and its heighth. The center I remarked in the celebrated meteoric shower many years ago, was about 10 or 15 degrees southeasterly of our zenith. I computed its height after receiving accounts of its apparent altitude, as far south as latitude 30 degrees, and was enabled to estimate approximately its altitude to be about *four hundred miles*. Various calculations have been made; Marian made it 565 miles; Bergman, 460; Euler, several thousand; Dalton, 100. It has been commonly believed to be confined to our atmosphere, or less than 50 miles altitude.

Modern science connects light with magnetism, &c., &c. Light is usually with heat, latent, but penetrates all space; friction shows it. The solid bodies of the universe intercept its action and show light. The comets project great masses from their nuclei into void space. Our earth occasionally projects polar lights into space short distances. Our aurora of last August would be visible to nearest planets.

What influence these exert, if any, upon our vegetable and animal world, either for good or evil, deserves scientific examination. I differ with our ancient forefathers, who always assigned evil effects to these extraordinary celestial phenomena. I see no reason either in science or religion for evil instead of good to them. During the visit of the last great comet, I addressed large audiences at the saloon in Niblo's garden. And assured them on one night that I believed we had just been enveloped in a portion of its tail, because the air seemed so unusually purified, and its velocity in passing over us must have been forty times greater than that of a cannon ball. Almost all our meteorological phenomena are blessings; thunder storms, and gales, and hurricanes, heats and colds, are so many curatives of evils of stagnation. They are to our earth what perfect exercise, change of air, &c., are to each man, good!

The Farmer and Gardener, of Philadelphia, Vol. 1, No. 8, quarto, monthly, speaks of the superiority of roofs of slate for farm houses. Can be made for $7.75 per 100 square feet, where shingles cost $9.90—with safety from fire, and with great duration.

Peter G. Bergen.—I would recommend a new kind of iron for roofs. It is coated with a composition paint, and the plates are made so as to be put together without solder. It is much cheaper than tin. There is no difficulty about expansion and contraction.

Dr. Trimble.—One of the hospital buildings at Philadelphia is covered with slate, and it is found a very cheap roof. It comes from a Pennsylvania quarry that produces it at low rates, and it is put on in some new method.

Wm. S. Carpenter.—The best slate costs $10 the square of ten feet. Tin costs $11, put on the roof.

Peter G. Bergen.—The iron roof I speak of cost $9 a square.

Dr. Trimble.—The slate roof I spoke of is put on in some kind of cement, and is laid quite flat. There is a difficulty in all metal roofing about the contraction and expansion that has hitherto prevented its universal adoption. One of the objections heretofore made to slate roofs, is the necessity of making them quite steep. That difficulty is overcome in the roof that I saw in Philadelphia.

HOW MUCH SUPER-PHOSPHATE PER ACRE?

This question come from W. C. George, Charlestown, Mass., who says the farmers there have no experience to guide them, and they always look to the proceedings of this club for information, and therefore wants to know how much super-phosphate should be applied per acre.

Mr. Robinson.—I answer 600 pounds to begin with, and if that proves a paying application, increase the dose. The object of manuring is not how much can I get along with, but how much I can use profitably.

Andrew S. Fuller.—I knew one person whose hired man applied super-phosphate by the shovelful, and it showed nothing better than upon the adjoining land. Bone dust produced a very decided beneficial effect.

Wm. S. Carpenter.—I have never used anything better than Peruvian guano. I use 300 to 500 pounds per acre. It produces beneficial results upon corn and turnips. So does bone dust; but super-phosphate I have not found profitable. There is so great a difficulty in procuring super-phosphate of a reliable, good quality, that I have given up the attempt. I find the guano the cheapest.

GUANO AND SQUASH BUGS.

R. Norton, of Worcester, Mass., after speaking of the interest with which he reads the sketches of the proceedings of this Club, contributes his mite of information to get rid of the yellow bug that infests young squash plants. He says:

"I have a row of twelve hills of winter squashes—examined them on the second or third day after the plants came up, and found, I should judge, not less than three bugs to a plant. I put a heaping tablespoonful of guano into about four quarts of water, and with the twigs of a bush sprinkled it so as to wet the plants and the ground under them thoroughly. Two days afterward I visited them and found a great swarm of bugs hovering over the plants, but not one on them. I continued the process every third or fourth day until the vines began to run. The yellow bug did them no injury, and the black bugs were unusually few."

CUTTING POTATOES FOR SEED.

Mr. Robinson read the following letter from a Rhode Island farmer, which certainly has a theory worthy of very serious consideration by all potato-growers. It is simply going back to first principles:

"Forty years ago a crop of 200 bushels of potatoes to the acre was not considered a large one. From the time they were first introduced into this country, down to that time, seed potatoes were planted *whole*. By and by reports came that the practice in some countries was to cut the seed, or divide the potatato into parts. The idea was a very feasible one, that the seed so sub-divided, should be more susceptible to the warmth of the ground, a great saving, &c.

"Without naming the precise time when the 'potato disease' did commence, I do think the true cause was the cutting of the seed. That vital principle in a potato, called starch, should be left undisturbed to nourish and mature its progeny. Now, how long can this vital principle remain in a small piece of potato, the ground being such an absorbent? This question can best be answered by the appearance of the tops, when they begin to look black and spindling. Another proof of my theory is, the scarcity of potato seed-balls. Forty years ago they were scattered in rich profusion over the potato fields. Now, in many cases, the vines are 'going back before they complete their blossoming.'

"In olden times, when potatoes were being harvested, it was not unusual to find the old seed potatoes in the hill, hardly distinguishable from the new ones in appearance, having staid by like a faithful nursing mother to the end."

Wm. Lawton thought the disease was produced by an electrical effect.

Wm. S. Carpenter thought the disease attributable entirely to insects.

John G. Bergen.—In reference to the insects that attack potatoes, I am not sure that they produce the disease. I believe the cause is atmospheric. It also affects many other vegetables. I have no faith in the theory that the disease is owing to cutting the seed. This has been pretty well proved among the large potato-growers of Long Island. Still I believe that whole potato seed, as a general thing, produces the soundest tubers. The disease was common, at least in Europe, long before the practice of cutting potatoes. The best protection against the potato disease is poverty. Where no manure is used the potatoes are apt to be the most free from disease.

SPRING PLANTING AND PRUNING.

This subject was called up, and elicited an interesting discussion.

Andrew S. Fuller gave some practical illustrations with grape vines, showing how the unripe wood of a vine dies, and how it should all be pruned away. He said:

For planting cuttings out door, I would always make short withings, say two eyes, and after the shoot has started up a few inches, break up the earth around the upper eye. In setting the cutting, make a little hollow, and leave the top bud just level with the earth at the bottom, and afterward cover over so as to make the earth level. Let only one cane grow from a cutting. In setting rooted vines, prune away roots and branches. All the fibrous roots will die, if not pruned away. The same is true in relation to trees. It is better to grow vines from single eyes, if the wood is ripe, than from immature wood upon roots. Grape vines at two years old are much better for transplanting than older vines.

THE DELAWARE GRAPE.

Mr. Roberts read an article from the Germantown Telegraph, condemning in unmeasured terms the Delaware grape, stating that it will not ripen in this latitude.

R. G. Pardee, in answer to this, stated that he saw Delaware vines at Newburg, last season, in full bearing, that ripened perfectly.

Solon Robinson.—The acrimony of that article is as clearly traceable to a Flushing nursery as daylight is to the sun—particularly the remark about strawberries. It it very much like kicking against the pricks, to kick against the Delaware grape in the present state of public opinion in regard to it. I pledge my word that it will ripen perfectly wherever the Isabella will ripen so as to be barely eatable.

PRUNING PEAR TREES.

Andrew S. Fuller.—In transplanting small pear trees, I always trim off the small roots very close. If you get trees from a distance and find that the roots are injured, by drying or bruising, cut them off close up to the main root. I would cut off the top of a one year-old pear, within a foot of the junction upon the quince root, and in planting, always set the junction below the surface of the earth. A quince will send out roots from the bark at any point. It is still an open question, whether it is advisable to get roots from the pear stock, as when that is the case, the quince may die. If you wish to get roots from the pear stock you must set the junction full four inches below the surface. I believe that the dwarf pear on a quince can be transformed into a long-lived pear tree, by making the pear stock take roots. In pruning dwarf pears, care must be taken each year to prune so as to keep the tree nicely balanced. In pruning off roots to set out, be careful to turn the tree bottom up, and cut the roots on the under side, so that when the tree is set, the cut part of the roots may sit flat on the soil.

CHERRIES.

Mr. Fuller illustrated the growing of cherries, and showed the cause of the failure of a great many nursery trees to be because the graft is set upon stocks that are naturally dwarfs, and will not support a standard tree. In setting out cherry trees for dwarfs, I trim in the roots very short, and cut down the stock within a foot of the junction. All trees from a nursery should be trimmed down close before they are sent away, and would be, only that buyers are always looking for something very large. I never order trees from a nursery over one year old. Buyers might save one-half the expense of buying trees, if they would order yonng trees, and have them pruned of all unnecessary roots and limbs, to save transportation.

All of Mr. Fuller's observations were illustrated with trees and vines, which he trimmed as he would if he was going to plant for himself.

He stated that an acquaintance of his imported a large quantity of pear trees, with all the fibrous roots on, and planted them without cutting them away, and lost almost the entire lot. The roots were dry, and, of course, diseased, and had the same effect that a diseased limb has upon the human frame—it carried disease to the body, and destroyed life.

Mr. Carpenter advocated the general cultivation of dwarf pears upon quince stock, and would not try to get roots from the pear stock. He recommended summer prunings, by pinching off heads, instead of spring pruning with a knife. It has a better effect to pinch off, than to cut off heads.

A NEW WASHING MACHINE.

A large attendance of the sex most interested in all plans for reducing the labor of washing, were entertained by the exhibition of the "Cataract Washing-Machine," which does the work, without rubbing the clothing, so as not to injure the finest fabric. The principle is the reverse revolution of two cylinders, one within the other, so as to keep up a constant agitation of water, by which it is said the dirt is rinsed out of the clothing, instead of rubbing it out.

FRUIT PRESERVED BY A NEW PROCESS

Was exhibited by some Vermont Yankee, who claims that his process is very inexpensive, and that it will entirely prevent fermentation of fruit without injuring its flavor. Dr. Hays, of Boston, states that the process adds nothing injurious as food, and that he could not induce fermentation in the samples tested.

Adjourned to next Monday.

H. MEIGS, *Secretary.*

April 9, 1860.

Present 40 members. Wm. Lawton, of New Rochelle, in the chair.

ZOOLOGICAL GARDENS OF ANTIQUITY.

By H. Meigs.—Mons. Drouyn De L'Huys, Vice-President of the society of the Societe Imperiale Zoologiqne D'Acclimatation, delivered the following address on the zoological garden establishments of antiquity and the middle ages:

Gentlemen: Thanks to the high protection of the Emperor and to august patrons, we are raising in the Bois de Boulogne, upon new foundations, a monument to zoology and botany, and it will not be useless to look into the past for the vestiges of similar undertakings at various periods heretofore. From the highest antiquity, Asia has been celebrated for the magnificence of her gardens. Diodorus has left us those established by Semiramis at the foot of Mount Bagistanus—so famous that Alexander, on one of his splendid marches, turned aside to visit it. The splendor of the Persian paradise is reflected in brilliant poetry, tracing its wonders. As to the gardens of China, follow our friend Mons. L'Abbe Huc. Study in him the Poem of the Garden, written in the eleventh century by the statesman, See Makonang, and better still, the eulogium on the city of Moukden, written by the Emperor Kien Long, and translated by Father Amiot in 1770.

Humboldt said they knew, a thousand years ago, a great many precious vegetables, and cultivated them well. Recollect the prodigies of Roman sumptuosity; those magniffcent gardens of Lucullus, of Mecænas, Sallust, Pompey, Cæsar, Agrippa, and of Pollio. The eternal murmur of fountains, far-brought plants, artificial caves, woods, every figure of art and fancy, their winter gardens, flowers watered with warm water, all the lilies and spring flowers flourishing at the time of frost, vines and fruits too, the use of glass at Pompeii. In more recent times, the gardens of St. Thomas in Greenland (or Iceland), mentioned by the Brothers Zeni, in 1388, warmed by hot springs. Other gardens, and in the thirteenth century, at Cologne, by the sorcery of Albert the Great, as the vulgar said. In 1249, the convent of the Dominicans, on the 6th of January, visited by William, Count of Holland and King of the Romans, a garden full of trees, flowers and fruit, and the song of the birds in it, attributed by the outsiders to witchcraft, but all owing to the science of Albert, so far in advance of his age.

Linnæus says that the first banana ripened in Prince Eugene's garden at Vienna.

Lorenzo de Medicis filled his gardens with Oriental flowers, and his example was much copied.

Botanic gardens were established in Florence in 1545; Padua, 1546; Boulogne and Pisa in 1547; University of Leyden in 1575 to 1580; Leipsic, do; Faculty of Medicine, Paris, 1597; Montpelier, 1598; Giessen, 1605; Altorf, 1625; Jardin des Plantes, Paris, 1626; Jena, 1629; Oxford, 1640; Copenhagen, do; Madrid, 1655; Upsal, 1657; Coimbra, 1673; the park of Trianon in 1759. We are deeply engaged now in acclimating foreign plants and animals; and we now state those heretofore introduced, that we may judge of the importance of acclimation. Our wheat and buckwheat came from Asia; our rye came from Siberia; our rice came from Ethiopia; Indian corn came from South America; cucumbers came from Spain; artichokes came from Sicily and Andalusia; chervil came from Italy; cress came from Crete; lettuce came from Cos.

The fishes in the artificial ponds of Lucullus were sold, after his death, for 776,300 francs. Some taught their fishes to know their call, and kiss their hands, like dogs. Their fishes were named, and some kept regular accounts of their races, as of so many horses. Eels eat off the hand, and had rich ear-rings at Chios!

Quadrupeds, birds, insects and reptiles had their palaces in Rome. We know not any bird establishment now comparable to that described by Varro. "I have," he says, "a river passing through my villa, with a long alley on its banks, closed right and left by high walls. Here is my bird place—two porticos and double colonnade, closed by hemp twines, side and top. At each end close pavilions for shelter, when they want it." The camel was in France in the Merovingian period, and the cloth camlet then made from its hair—about 1,400 years ago.

The learned minister, De L'Huys, has availed himself of the million volumes of Paris, and with a zeal worthy of praise. History is the best teacher. Facts, and not theories, must and will govern man while he works on this globe! Whatever wild "isms" whirl his brain periodically, he must return to solid truth.

But we have sown the good seed of progress, which the good seed of the Gospel grows, and the tree has taken root. It was necessary for us no longer to be exclusively French, but to be cosmopolitan, to form one of the great world we inhabit for our own benefit and for universal good. Our work at first occupied a modest saloon; but we spread. Twenty-one sovereigns belong to our Society. We were only born yesterday, and now we are everywhere. Utility and pleasure go hand in hand from generation to generation.

"Jeunes de gloire et d'immortalité."
[Forever young in glory and in immortality.]

Schiller said, "Woman knows how to add charm to utility; the *utile dulci*—useful and sweet. We will add to our animal races the antelope, gazelle, alpaca, half she ass, stag, hemione, and the yak—that ox with the tail of the horse—the tapir, the kangaroo, and the birds and the fishes, and the art of dressing nature.

The place where a great variety of things—vegetable and animal—that have been established in the garden of plant, Paris, come from, was also mentioned, among other things, that the common alder came from Persia; the olive, from Greece; the laurel, from the mountains of Asia; the dahlia, from Mexico; the white cabbage, from north of Europe, and the red and green cabbage from Egypt; melons from the the East; peaches from Persia; potatoes and tobacco from South America; prunes from Syria; while Asia was given as the native country of the grape.

Andrew S. Fuller objected to this part of the statement. He said the grape may be a native of Asia, but America had more native grapes than are known in any other country. The *Laurus nobilis* is the one that should have been specified as the particular one of the family alluded to in that paper, as we certainly have several native laurels in this country. It is very true that there are no plants of a high order, indigenous to Europe and America.

BLACKBERRY SEED.

Some one wrote to the Club for Lawton blackberry seed. Mr. Lawton said that the uncertainty of getting the product exactly like the original deterred him from sending out any seed. But the seed of the genuine berries can be procured of seedsmen. Great efforts have been made to get improved berries from the woods, by marking the vines in the field that produced the best fruit, and then transplanting the vines to the garden. Capt. Lovett, of Massachusetts, pursued this course for many years, and then abandoned it for want of success. It is possible that we may yet get an improvement in some new seedling from some of the best sorts to be found.

A gentleman inquired if any seedling had yet been originated from the Lawton blackberry that gave good promise?

Solon Robinson.—Yes, sir. I have lately seen one that certainly does. It has shown beautiful fruit, and it is to be expected that enough will be grown this year, to prove it a valuable acquisition to the list of berries; but if it is only tolerable, it will be grown as an ornamental plant, as it is the most beautiful blackberry plant that ever has been seen—the canes are of a light green color, and almost thornless. It will be reported in due time to the Club.

Wm. S. Carpenter.—I am glad to know that there is a disposition to plant the seeds of the best blackberries, and I hope to see an improved variety spring from such planting, better, if possible, than the Lawton, which has been of such great importance to the whole country.

Andrew S. Fuller.—This Club has done more for the country in recommending the cultivation of the blackberry than any other society.

R. G. Pardee—Yes, and small fruits generally. The discussions here have been extensively read, and have given an impetus truly wonderful to the business.

Andrew S. Fuller.—One word in relation to the name of the Lawton blackberry. I think that Mr. Lawton is entitled to the name upon the same principle that Mr. McClure is entitled to the name of the McCluria (Osage orange), or Drummond to the name of Phlox Drummondii, or Taylor to the Bullitt grape; not because he originated it from seed, but he rescued it from oblivion, and because Bullitt is not a good name for a good grape. The discoverer or introducer of a new plant is just as much entitled to the name as the originator of the seedling. In regard to the name of the Lawton blackberry, it was not one of Mr. Lawton's own seeking. He was the first to make the fruit known to the public, and being a constant attendant of the meeting of this Club, he naturally brought the fruit here for exhibition, as something remarkable, and a member of the Club, (the Secretary, Henry Meigs,) proposed to name it the "Lawton Blackberry," and that name being printed in the Tribune, became widely disseminated, and is a better name than "New-Rochelle," because it is shorter and more definite. If its introduction and name have been profitable to him, the fruit has been still more profitable to the world.

A NEW HUMBUG.

Solon Robinson.—I will read the following advertisement, which I will print, suppressing the name of the advertiser, for the purpose of exposing the humbug, and putting people upon their guard against an imposition equal to that of the "honey-blade grass:"

EGYPTIAN CORN.

"The subscriber offers to farmers throughout the country, the Egyptian corn, which, upon trial last year, was found to ripen, planted even the first of July. It is estimated, from its very prolific qualities, to yield two hundred bushels per acre, and weighs, by sealed measure, sixty-five pounds to the bushel. This corn was produced from some procured direct from Mr. Jones, our Consular Agent, directly on his return from Egypt. It requires no different culture from that of other varieties, and in the south two crops can be raised in one season on the same ground. It grows in the form of a tree, and twenty-two ears have grown upon one stalk, and will average from five to fifteen. For domestic use it is unparalleled. When ground and properly bolted, it is equal in color and fineness to wheaten flour. As a forage crop, by sowing in drills, or broadcast, for early feed, there is no kind of corn so well adapted to milch cows, and none that will yield half the value in stalks or corn.

"It can be successfully grown in any state of the Union, from Maine to Texas. I can give the most satisfactory reference that the corn is, in every respect, what I represent it to be, and further, I am the only person throughout the country, who has this variety of corn. Having secured a quantity I am now able to fill all orders for those desirous of testing it.

"To any person who will inclose in a letter $1, in stamps or currency, directed to me, I will send, postage paid, sufficient corn to produce enough to plant, the following year, from twenty to thirty acres; also directions for planting and cultivation."

There is some truth in this advertisement. This Egyptian corn can be grown in any State, and has been for many years in most of them, and the seed is almost as valuable as that of broom-corn, and the stalks and leaves for forage not as much so.

Prof. Mapes.—We have had an Egyptian corn here in cultivation many years, and it is highly probable that it is the same thing mentioned. It is not a desirable plant for cultivation. It will yield about sixty bushels of seed per acre, which pigs and chickens will eat, but the grain is unfit for human food, and valueless in comparison with our common cereals.

Mr. Carpenter said he grew the Egyptian corn last season, but does not deem it a desirable plant for a crop. It is somewhat ornamental, and that is its greatest value. It is nothing new.

PEARS ON QUINCE STOCKS.

Solon Robinson.—A letter from Ruth Lynde, of New Bedford, says:

"There is a large pear orchard in the neighborhood of our city, containing the choicest fruit, grafted on pear and quince stocks. The latter were planted thickly, supposing they would discontinue to bear as the former increased. But to the owners surprise they increased in size and vigor, so that he had to remove many of them, and to his astonishment the pear grafts had put out roots at the junction with the quince, and the trees were healthy and vigorous, and he sold them at high prices.

"The man who removed them does garden work for me, and he said all that he reset, he cut off the quince stock, and he told it as quite an important fact. These trees were fastened firm to a stake when first set out, and the graft was not an inch under ground, in many cases, he said, just on a level with it."

NATIVE FLOWERS.

She also inclosed some seeds of native flowers, two varieties: *Penstemon* and some of the *Dodecatheon media*, (the American cowslip). "The latter," she says, "some one ought to have, who has a green-house, for if carefully managed, each seed will make a plant."

The Penstemons are very showy perennials, blooming the second year from seed, sending up tall spikes from handsome flowers. The foliage is very glossy and handsome. These plants can be propagated from cuttings.

A PREMIUM LIST.

Judge Meigs read the following from Bulletin Manuel de la Societe Imperiale Zoologique D'Acclimatation, Paris:

List of Premiums for 1860, *for establishing the Alpaca on the Mountains of Europe or Algeria.*

	Francs.
Three males and nine females, at least, a medal worth	2,000
For the Hemione, a medal worth	1,000
Kangaroo (macropius gigantus), a medal worth	1,000
Cassowary of New Holland—Nandou Rhea Americanus,	1,500
Great Bustard (Otis tarda), a medal worth	1,000
Any new game bird, a medal worth	500
Any useful fish (of brackish water), a medal worth	500
A new silkworm, a medal worth	1,000
Any wax-making insect (other than the bee), a medal worth	500
New varieties of the Chinese yam—Dioscorea Batatas,	500
Quinquina, in south of Europe, or any European colony,	1,000
Premiums by Members.—Camel (by M. Chagot, sen., a merchant), medal	2,000

FRUIT CULTURE—(CONTINUED).

Prof. Mapes.—I make my dwarf trees pay the second year after setting, and afterward they give a large profit. I set my trees so as to get roots from the pear stock. I think the quince roots a great advantage at first. One great secret in successful fruit culture is, to keep the bodies clean. I simply wash my trees with caustic soda. Take one pound of common sal soda (bleachers' No. 1 soda) and heat it red-hot, in an old pot, and put it in a gallon of water, and apply it with a brush. It is far superior to any other substance, and will kill every insect, and make the boles perfectly clean. It takes off all old dead bark, and it will destroy the scale insect. To heat it, you may take an old stove-pipe and hammer up one end, and put the sal soda in it, and set it in a hole of the cook-stove, and it will heat hot and expel all the water, and you may then put it at once in the water until it is completely saturated, and you must then use it while it is fresh. It may be used at any season, and on any sized trees. It will smooth the rough bole of an old apple tree.

As to pruning dwarf pears, I aim to keep them in a pyramid shape. The bearing limbs of a tree are the natural upright ones. I choose to have the branches start close to the ground. I would let a dwarf tree bear only one pear the first year, two the second, five the third, and as many as I wish after that. I grow 50 to 200 pears to a tree, 5½ feet high. Upon my trees, the quince and pear roots are both active, and give sustenance to the tree. The pear tree is a great water drinker, and all the motions of its leaves are so many mechanical engines to pump up water. I mulch my trees, but am careful to remove it in the fall, as soon as the leaves begin to fall, and afterward put it back, before the ground freezes. As to manuring pear trees, I believe that no putrescent matter should ever come near them. Bones and potash on the surface, are the kinds of fertilizers for pears, and the bones should be made soluble. Of course, I manure my trees with super-phosphates alone, and the more I can sub-divide the particles the better. For this purpose I use dry muck, or even common soil as a divisor.

Wm. S. Carpenter.—One of the secrets of greater success with trees where roots extend from the pear stocks, is that the quince roots will not run off over six feet, while the pear roots will reach twenty feet. I find bone-dust the best manure that I have ever tried.

Prof. Mapes.—I plant my trees in a hole four feet deep, and four feet wide, filled with surface soil, and in that hole the roots grow as they would in a pot.

Andrew S. Fuller.—I find in some cases that where the pear sends out roots, those from the quince die. In some cases it has been proved, not only with pears but grapes, that deep-rooted plants are always the most healthy—and perhaps that is the secret of Prof. Mapes' success. I would not manure the surface, nor use as a mulch anything that will give food to the tree. Most of the old vines in this city that have failed have all their roots on or near the surface. It is as healthy to keep the body of a tree clean, as it is that of a person.

Prof. Mapes.—We may plant pears too deep upon badly prepared land, but not upon well-prepared soil, thoroughly underdrained. Shallow disintegration of the soil will not answer for pear or grape growing, because, as Mr. Fuller has observed, where the roots run so near the surface, as they naturally will upon soil that is not deeply dug and drained, the sun seems to have such an effect upon them that the tree or vine loses its vigor, and has not power to ripen fruit.

STRAWBERRY WINE.

A sample of strawberry wine, made by James McCreedy, of Plattsburgh, N. Y., was sent to the Club, and, judging from the gusto of the tasters, we should say it must be pretty good cordial, but no more like wine than any other fruit juice, sweetened with common sugar, and fermented, by which we get the acid of the fruit, sweetened, and the alcohol of a portion of the sugar. Some gooseberry wine from the same manufactory, bore the same character, and this is also strictly applicable to most of the grape wine manufactured in this country. It is a grape-juice-and-sugar mixture, and is a pleasant drink, but unworthy of the name of "pure wine."

John Bruce.—I wish to draw the attention of the Club to some singular peculiarities of a newly discovered lake, called Mono lake, situated in the neighborhood, or in the tract of the new silver diggings, that are said to yield so abundantly, in that portion of California The following description I have received from my sons, who thus speak of it:

"The lake is some six miles in extent, and without any external and visible outlet. The water it contains flows from the circumference to the centre, and there passes down a subterranean passage, *where to*, is as yet unknown. One peculiarity of the water is, that a person wading in it that is troubled with corns on their feet, it has the effect of loosening the corns, and by a few such applications, will eradicate them. A person wading in the water of this lake with boots on, it has the effect of reducing the leather to resemble wet brown paper, and possessing no more strength after the immersion." My sons say they "are under the impression the water is alkaline in quality, as any clothing washed in it requires only a simple rinsing to thoroughly cleanse them. Some things are discolored, or rather lose their color in the operation."

They have sent me in a letter, a substance, they call the nympha, of a peculia fly that breeds in the water of Mono lake, being the only living thing known to exist in it. This substance I submitted to, and divided between two of the chemical members of this Institute, for their opinion on it. This nympha covers the whole surface of the lake in great abundance; is gathered by the Indians in its season, and is stored up by them as food for winter, and must be nutritious in quality, for when tried out, is found to yield *seventy-five per cent of beautiful burning oil.* Thousands of tons of this material can be collected every season; the whole lake being about the consistence of Indian meal gruel, over its whole surface.

Adjourned. H. MEIGS, *Secretary.*

April 16, 1860,

Present 50 members. Adrian Bergen, of Kings county, in the chair.

THE KIRKLAND RASPBERRY.

The Secretary read from The Cincinnatus, an article highly commendatory of the Kirkland Raspberry. The fruit ripens there in June, and continues three weeks. It is supposed to be a seedling of the Antwerp, but more hardy.

Mr. Lawton, of New-Rochelle, stated that he had the above raspberry in bearing, and that it bears good sized berries, of a red color, and good flavor.

R. G. Pardee.—Most of the plants sold for pure Antwerp raspberries, are poor things, and, in fact, we have but very few sorts of raspberries worthy of cultivation, that are hardy. Brinckley's orange is about the best light-colored sort cultivated, but that is not quite hardy. The Belle de Fontenay, is highly esteemed, but that, nor no other, can be truly called "ever bearing." The only way to get a full crop in autumn is to cut away all the canes in May. That throws the strength of the whole root into the new canes. The Belle and the four seasons, and perhaps some other of the ever-bearing sorts, will produce a good fall crop with this treatment. I believe the Fastolf the best family raspberry that we have.

Wm. S. Carpenter.—Here is a plant of the Belle de Fontenay, that bore a crop last fall, and the same cane will produce a crop this spring. As a general thing, Mr. Pardee is right, in saying that no raspberry will produce two crops in one year from the same canes. Mr. Carpenter also exhibited specimens of the Allen raspberry, which he thinks are of a foreign variety, though called a native. It is a pretty good bearer and hardy.

THE AUSTIN STRAWBERRY.

Mr. Carpenter showed specimens of the Austin strawberry, which has the appearance of being a very strong growing plant, and it is said that twelve berries have been picked that weighed a pound. It is stated that the berries have been frequently picked that measured six inches in circumference. It is the strongest rooted plant that we have ever seen. In answer to a question from a member, Mr. Carpenter stated that the Austin strawberry originated with the Shakers at Watervliet, New York, and that it has not yet been dissèminated, but will be next fall. It is probable that persons in this vicinity may be able to get a supply at a moderate charge, through Mr. Carpenter, who is a city merchant, as well as a country farmer. The Shakers have refused to sell the plants, until their value was fully proved, and a stock accumulated sufficient to supply the demand.

THE CATAWISSA RASPBERRY.

Mr. Pardee stated that the above named raspberry had the strongest evidence in its favor as an ever bearing plant.

Mr. Carpenter.—The objection to this variety is that it does not propogate by offshoots. It is no more prolific, hardy, or ever-bearing than the Belle de Fontenay. The fruit is small.

MANURE—WHAT SHALL WE USE?

Solon Robinson.—The following extract from a letter from West Townsend, Mass., shows that the question of manure is exciting attention. The writer asks: "Where stable manure cannot be had, what is the next best manure for potatoes, corn, &c.? If lime, ashes, or muck, in what proportion, &c." I answer, first: stable-manure is not the best for potatoes. In fact, it is the worst, and it cannot be so profitably applied to corn as it can to produce grass, and then produce the corn crop with the sods of that, and a small addition of some concentrated fertilizer. The best manure for potatoes, I believe, is an inverted sod, with a top-dressing of ashes, or plaster, or both combined. Salt and lime would both be beneficial. As for quantity, no one will be likely to get too much. When lime is used to the greatest extent in Pennsylvania, Delaware and Maryland, about 30 bushels per acre of powdered lime, that is by air slacking, is considered a good dressing, to be repeated at intervals of two or three years, until the land gets four dressings. If quick-lime could be procured, and slacked with water saturated with salt, and exposed under cover for some weeks to the air, occasionally raking off the outside of the heap, thirteen bushels per acre to any land that was full of inert organic matter, it would prove equal to a liberal dressing of manure, when applied at the rate of thirty bushels per acre. Salt may be applied alone to most land, with advantage, at the rate of five to fifteen bushels per acre. As to muck, from one load to a thousand per acre will pay for its application.

SOWING CLOVER SEED—A FAIR CRITICISM.

Solon Robinson.—I hold in my hand a letter written by John Johnson, of Geneva, who is one of the best farmers in the State of New York, which criticised some of our sayings and doings here, in very just terms. Mr. Johnson says:

"I read that Mr. Pell sows one bushel of red clover seed to the acre. Now such nonsense as this should not go out among farmers, a great many of whom are opposed to anything like book farming; and when they see a record of such folly, it is less wonder that they should believe nothing that is written on agriculture further than their own practice.

I thought at the time that the statement was a most extravagant one, but I felt no disposition to dispute it, nor would I dispute a man who should state the only manure he used upon his land was cats and dogs, which rained down; because I have heard of its raining cats and dogs, as long as I can remember, and I should, of course, believe that it rained a manurial supply of these animals upon any gentleman's farm who asserted it to be so. Just so with the clover seed; I believed that Mr. Pell sowed a bushel per acre, or thought he did; but I did not believe that any body else ever did, and I was satisfied that some folks would not believe that he did.

I stated at the same time that I believed clover seed the cheapest substance that a farmer can use for manure. But I did not mean that he should use it in bulk, as he would guano or plaster, but sow it, to grow a crop of clover, which he would allow to rot on the surface, or turn under."

In relation to quantity of clover seed to the acre, Mr. Johnson says that his man once accidentally sowed by the use of a machine—

"Twenty-four quarts per acre of clover seed. The result was, where the 24 quarts were sown to the acre, the clover never got taller than the natural white clover we some seasons have in such quantities, but which is generally too short to cut; while that sown at about 10 lbs. to the acre was as good as I could wish. I never have sown over twelve pounds of clover seed to the acre, unless done by mistake, and I have always had large crops if any one else in the neighborhood had."

Now, I think that Mr. Johnson must acknowledge that if Mr. Pell's statement was "nonsense," that was calculated to do mischief, that it has been the occasion of drawing out a very valuable correction, which will do good."

I will read a little further from Mr. Johnson's letter upon the "quantity of seed per acre." He says:

"*Timothy.*—Half a bushel of timothy seed to the acre will give a better quality of hay, but with me the quantity is much less than six quarts. I know we read that those who sow bountifully shall reap bountifully, but this will not hold good in farming.

"*Wheat seed per acre.*—I vibrated between one and three bushels of wheat to the acre for several years, but settled down at 1½ bushels, believing it to give the greatest yield; although with 2 to 2½ bushels the wheat ripens a few days earlier. To prove this, a farmer has only to sow half an acre with from 2½ to 3 bushels per acre, and sow the other part of the field 1½, and it will be found that the thick sown will be ready to cut a few days sooner than the thin.

"*The yield per acre.*—Mr. P. published that he had 78 bushels of wheat from an acre—the average of the field. That was more than I could believe, and I made inquiry of a friend of mine (who was acquainted with Mr. Pell), as to Mr. P.'s farming matters. He told me that no doubt Mr. P. believed he had the quantity named, to the acre; but he said Mr. P. was a man of wealth, resided in the city, went occasionally to his farm, and no doubt had the acre accurately measured, and gave orders to have it thrashed and accurately weighed by itself. But he says: 'I have little doubt but his men thrashed 3 acres for the 78 bushels, and told him they only thrashed the one.'

"*Blunder in Measuring.*—Now I think there must be some such blunder with the clover seed. I think, however, that Mr. Pell has not yet seen the bushel of red clover seed sown to the acre something like twenty years ago, be the same more or less."

I hope this just though severe criticism will serve as a caution to all of us not to make assertions here, even if they are true, that the world outside who do not know our characters for veracity will never believe. Another letter-writer says:

"We want less fiction and more reality in these days of humbuggery; not that I would insinuate that the members of the Farmer's Club would intentionally humbug the farmers who read their proceedings."

Wm. S. Carpenter —I sow eight pounds of clover per acre, and would not sow it until after hard frosts are over. I have no doubt that Mr. Pell did sow a bushel of seed per acre, but I don't believe it all grew.

Wm. Lawton.—I hope members will be careful not to make extravagant statements that will be censured outside of our meetings. Our object is to give each other our experiences.

Mr. Moody.—The difficulty in the statement is, that we are not definite enough about the quality of soil. Some soils might not produce as many plants from a bushel of seed as upon other soils with ten quarts. With timothy grown for sale in this city, it is an object to sow them, because it grows coarse and sells better; the livery stable men like it because it remains a long time in the rack uneaten.

Mr. Meigs.—There is a great variety of soils and circumstances to influence crops. It does not follow in anything that is grown that it is better for being of an overgrown size.

PLANTING—THE PROPER DEPTH, &C.

This question was now called up and discussed by a number of the farmers present.

Mr. Wm. S. Carpenter.—I am in favor of shallow planting. Corn planted at three-quarters of an inch deep came up in six days, and corn at two inches, nine days, and five inches seventeen days—the same seed and same preparation, in the same field. I lost half of a crop once from deep planting. Trees I would plant in deeply dug holes, filled in, and put the roots near the surface.

Mr. Meigs.—We have for many years been told by Mr. Comstock, that he had invented a new and excellent mode of planting, superior to any ever known; he calls it *terra-culture* (agriculture in fact). He asked our Legislature *one hundred thousand dollars for his secret.*

I practiced, almost fifty years ago, the *secret*. It was *very shallow planting.* I had remarked the admirable growth of corn in the loose droppings of cows in pastures. The first leaves spread out broad and strong, resembling *fetticouse,* instead of the very common appearance like a yellow goose-quill, from corn planted two or three inches deep. I imitated this fine example. The soil being, as I always made it, light, two feet deep, and added from my compost heap of everything, reduced to the condition (by fermentation) of *Maccaboy snuff.* I put a small handful in each hill; covered that about one or two inches with the soil, and then planted the corn half an inch deep, and pressed down with the back of my hoe; and no better corn has ever been raised than mine. I took care of every stalk of it, for *each wants* all it can get. I let no weed as *big as a needle* grow among it, and sometimes, as a finish, after suckering it and taking off the lower leaves that showed imperfections, I used to sweep between the rows with a new broom, so that my lady friends could promenade my corn-field, hid entirely from view by stalks often sixteen feet high.

For high manuring I had 120 gallon casks, set up with cock at the bottom; straw and some small brush inside as strainer; and in these casks I put every material I could gather into this pipe; hen, horse, cow dung, urine, soot, ashes, rotten wood, vegetable fragments, bones, refuse meats, soap suds, lime, and filled in with rain water. After some three weeks I drew off a pint of it into a bucket of rain water, to sprinkle plants. I used it, especially, on my celery, which I wanted to grow as tall as that of my old master, George III, at Kew. In hilling up I was obliged to use cheap boards to enable me to make the earth hill up high enough. I succeeded in raising solid celery about four feet high, but *George* had grown it *six* *feet* high *at Kew.* Mine however was blanched about *two and an half feet* and resembled the whitest ivory, and was deliciously crisp and tender.

My father, who was the professor of astronomy and natural philosophy, in the University of Yale, always rose about 5 o'clock, A. M., and went into his garden, and I with him. He used to say constantly, nature provides for plants and animals all they want, but the provision must be *gathered together for the plants!* animals go for it, plants must have it brought to them; and all the elements of our earth constitute their food! They want disintegrated rocks, sand, clay, mineral, animal and vegetable remains, rain, electricity, snow, heat, clouds, wind, shade, light, and all operating on at least two feet deep, of perfectly pulverized soil. Then a cucumber and a pepper, a crab-apple and a sugar plant, standing on the same square yard, *can draw on the soil all* each wants, hot or cold, sour or sweet, from every *square foot.*

And science knows nothing about the *ultima ratio* of it, and never can know; *for in every atom of vegetable and animal life, it is creation by God alone;* and I found by experience, that every square yard in a garden, was better suited to *some one plant than any* other. I always grew noble celery plants in at least half shade. France says, *clouds help some of us by shading fields occasionally.*

Mr. Thompson, of New York, said that his father plants one-half to one inch deep, and does not hill the corn.

Mr. Pardee.—If we understand fully the nature of the soil, we may work intelligently. Soils often are very various in the same field. One of the reasons of failures of crops is because we have neglected something that is needful. Many persons think that if the surface is pulverized and manured, it must produce a good crop. Many city dwellers spend much money to make gardens, and add abundance of crude manure, and then wonder that plants will not grow perfectly. I would never use stable manure in a garden until it is most thoroughly decomposed or liquefied. I wanted potash in my soil, and that I added by using unleached ashes. So I have used lime, salt and bone-dust, but never crude manures.

Mr. Meigs.—Torrello, of Italy, some three hundred years ago, taught the tilling of land eight times before planting, to be as good as manure.

Peter G. Bergen, of Long Island.—With horse manure, you may put it on crude in the fall, and take all the leakings into the soil, during the winter, and then, if you like, rake it all off in the spring. We have soil on Long Island, that would never be benefited by digging it over and over. As to the planting, it depends altogether upon the nature of the soil, whether the holes should be dug large and deep. One old gardener insists that all stone fruit, planted with a flat stone under the tap-root, a little below the surface, will do much better than in any other way.

Mr. Pardee.—If we put stable manure on the surface, we shall get the weed seeds into the soil; and that is my objection to stable manure for gardens. Weeds and grass are particularly objectionable in strawberry beds. You cannot get them out without injuring the plant. I keep my top soil very loose, and so I do the subsoil, but without mixing them together. I sometimes add street-sweepings; but I add them far below the surface.

Mr. Thompson.—I bury lime in the center of a pile of horse manure, and that decomposes the manure and kills weed seeds.

Wm. S. Carpenter.—If farmers would spend more time in destroying the weeds before they go to seed, it will pay better than almost any other work. I always have my potatoes carefully weeded out after I have done plowing the crop. I aim to have all weeds destroyed on my farm before they seed.

Peter G. Bergen.—Mr. Hovey, of Boston, manures his trees in the fall with horse manure, spread on the surface. As to corn-planting, much depends upon the state of the weather at planting, as well as the condition of the soil.

This question was still further discussed by a good many persons, and continued to the next meeting, to which the subject of floriculture will be added, and spring work in general.

Notwithstanding the rain, the meeting was well attended, and the discussion animated and interesting. Of course our reports are intended only to give a synopsis of the business.

Next subject, "Flowers and House-ground Shrubbery."

The Club adjourned.

H. MEIGS, *Secretary.*

POLYTECHNIC ASSOCIATION.

The by-laws of the American Institute, authorize the formation of a Scientific Club, for the discussion of subjects, relative to manufactures, arts and sciences, to be composed of members of the Institute, and to be under the supervision of the Board of Science and the Arts. The Polytechnic Association, was organized under this provision of the by-laws. Its proceedings are conducted much in the manner of those of the Farmers' Club. There are no restrictions upon the debates, other than those of parliamentary courtesy. Its discussions embrace the widest range, call out the most varied talent and not unfrequently elicit valuable contributions to science. Many of the subjects discussed, being capable of mechanical or chemical illustration, and affording, as they frequently do, opportunities for vigorous debate, the proceedings are interesting to the public as well as to the student and men of science. The meetings are public and free to all.

It may be proper to remark, that the *dicta* of members of the club are not to be taken as the settled doctrines of the Institute. Until passed upon by the latter or endorsed or approved by the committee on arts and sciences, the conclusions of the Polytechnic Association acquire none of the force or validity of an official act of the American Institute.

THOMAS McELRATH, *Corresponding Secretary*.

AMERICAN INSTITUTE, *April*, 1860.

PROCEEDINGS OF THE POLYTECHNIC ASSOCIATION.

AMERICAN INSTITUTE, POLYTECHNIC ASSOCIATION, *May 4th*, 1859.

Professor Mason, Chairman. Henry Meigs, Esq., Secretary.

The Secretary read the following extract from the "Londen Year Book of Facts," for 1859, viz:

"COMBUSTIBLES MADE FIRE-PROOF."

A wonderful discovery is recorded in the French papers. M. Carteron, has invented a paint which renders everything which it is applied to, fire-proof. In presence of the Emperor and Empress, experiments were made, proving its efficacy. Fire was applied to ladies' dresses prepared with it, without injury. A tent fitted up for a superior officer, with muslin curtains to the bed, &c., would not burn. A hut, also, of wood and thatched with straw, one half being prepared and the other half not, was tried. The prepared half was not burned while the other was. A small theatre with its scenery and all prepared, resisted every attempt to set it on fire."

"SOLID INK."

"M. Leonardhi, of Dresden, has invented what he calls 'Alizarine Ink.' He uses forty-two parts of Aleppo galls and three parts of Dutch madder, infuses these in hot water, filters the infusion, and in it dissolves five-and-a half parts of sulphate of iron, and one-fifth part of liquid sulphate of indigo. He then evaporates the solution to dryness, and moulds the residuum into cakes for preservation. One part of the solid ink dissolved into six parts of hot water, gives first quality writing ink.

"NEOGRAPHY, OR NEW METHOD OF PRINTING."

"The *Cercle de la Presse Scientifique* has received from a journeyman printer, named Chevallier, the description of a new mode of printing. He sought for a surface better for printing from than that of zinc, as employed in zincography, or of stone, as employed in lithography, or than that of any other substance heretofore used. He also sought to get impressions by various colors at a *single operation!*"

His mode of operation was as follows: He made a drawing on a piece of woven stuff or on any material that would absorb a liquid. The drawing ink was composed of lampblack, Indian ink, gum, sugar, and common salt. Over the drawing he spread a slight coating of gutta percha. When the gutta percha was dry, he washed over the surface with water. Now the ink, being composed of soluble materials, washes out, and the film of gutta percha which covered the parts stained with the ink washes off; the stuff then presents a surface penetrable by ink in all parts where the drawing had been made, and perfectly impenetrable in those parts protected by the gutta percha. The stuff being thus prepared, the ink and colors are applied in the liquid state at the back, while the sheet to be printed upon is applied at the front. Under the action of a press, the ink and colors pass through the unprotected parts and give a clear impression. Instead of applying the ink and colors as stated, a kind of permanent cushion, made much like the old inking balls, and properly charged with ink or colors, may be put under the "stuff," and many sheets may be worked off before it becomes necessary to renew the ink."

Mr. Seeley considered neography of doubtful value in the arts. The madder introduced into the solid ink was to him a new material for ink. The tannate of iron resulting from the action of the galls upon the sulphate of iron was an unstable dye, and could not give a permanent ink.

The Chairman stated that a solution of tannin when applied hot is successful in penetrating the skins of animals, and so converting the raw hides into leather.

Mr. Tillman.—"Tanning" is the process of chemically combining gelatine with tannin.

Tannin being an astringent, has a tendency to close the pores of the skin at the first contact, and thereby to shut up the innumerable avenues through which it should enter the substance of the hide, and, therefore the application of hot liquor to the skin effects the desired chemical action more rapidly at the surface, but produces a less pliable and a less durable leather.

As the skin during its growth has been constantly subject to the animal heat, it would seem reasonable to apply the tan liquor at a blood-heat.

Most patent chemical compounds for opening the pores of skins are worthless, because they, to some extent, destroy the fibrous texture of the skin.

In tanning it seems very important to "handle" the skins a great deal during the process. So we may say that the three essentials required to tan hides into leather, are, *tannin*, *time* and *motion*, the time and motion being inversely to each other.

The Chairman remarked upon the superior quality of the ink used in the olden times, and instanced an old Denmark manuscript, which excited our surprise at the intense beautiful black of its ink.

Mr. Coryelle stated that ordinary black ink is much improved by being boiled.

Mr. Roosevelt read the remainder of his essay on Chemical Paradoxes, remaining from previous evenings. This essay gave rise to an animated discussion on the various chemical theories propounded at different times, and especially upon Mr. Roosevelt's one, given in the first part of his essay.

FIRE-PROOF BUILDINGS.

The subject of the evening, "Fire-proof Buildings," being called up,

Mr. Seeley considered that anything which is combustible cannot be rendered entirely incombustible. We can only protract the burning of any substance, but even in so doing we shall gain something of protection against loss by fire. The results of the Carteron experiments seem to be somewhat exaggerated. Silicate of potash and alum may serve as paints to delay combustion by preventing the free access of oxygen to wood, &c.,

Mr. Meigs reminded the Association of the beautiful experiment on the combustion of iron by means of an abundant supply of oxygen, as exhibited during the war 1812, at Boston. A cannon, elevated about forty-five degrees, received a white hot roll of sheet iron ribbon, which, as it passed through the air, formed a long and powerful stream of flame, and the iron was totally burned up. Rolls of this kind were called *Carbonic rockets.*

Professor Hedrick stated that phosphate of magnesia is very incombustible, and that it can be used as a covering paint or can be injected into the pores of wood as a preventive of fire.

Mr. Veeder had, as an extensive dealer in oils, observed a singular loss of illuminating power in oils which had been much exposed to the direct rays of the sun. The same observation has extended to old timber, boards, &c.

The Chairman considered that they were already partially burned by the action of light.

Mr. Garbanati remarked upon the impossibility of protecting combustible property, even in fire-proof buildings, and the consequent great danger of having cornices, shutters, &c., of combustible material. On a late examination of the school-houses, nine out of ten were found to be dangerous. The same is the case with churches and other public buildings which are attempted to be warmed in an absurd manner for economy's sake.

The Chairman.—The extraordinarily frequent burning of our public buildings shows a singular lack of good sense which is not allowed to appear in private dwellings. The subject was under consideration about twenty years ago by insurance companies, who found that their profits were lost by such buildings, churches, warehouses, and others, not dwellings.

Mr. Garbanati suggested that a well paid fire brigade would lessen the number of fires.

Mr. J. W. Reed considered that the goods in an air-tight room could hardly be much damaged by fire originating in them. The division of stores into fire-proof departments seems practicable, so that the goods in one taking fire, those in all the others would be safe.

Mr. Tillman.—Combustion is the union of the oxygen of the atmosphere with a combustible. To prevent buildings burning, we must fill and surround them with a gas which is not a supporter of combustion, and which displaces the air. Or we must make the materials of the building incombustible. The first plan has been attempted by using steam to displace the air, and also in a secret method by "Phillips' Fire Annihilator." Both are, however, unreliable, although in single apartments, either may be of use to some extent. The other seems to be the true plan to follow where wood is predominant building material, and there are three different methods which can be employed to render it incombustible.

1st. To cover the wood with a substance which shall keep the temperature of the wood below the burning point. For this purpose the whole class of *alums* may be employed. Each atom of alum contains twenty-four atoms of water, and every atom of water absorbs 1,212° of heat before it arrives at 212° of sensible heat. During this process of absorption, the wood remains below the boiling point, and cannot take fire. Also the water, when driven off as steam, displaces the heated air, and thus still protects the combustible wood.

2d. To coat the wood with a substance which has already so much oxygen in it, that it can take no more from the heated air. The phosphate of magnesia is a good sample of this class of materials.

3d. To fill the pores of the wood, and to coat its outside, with a substance which contains another supporter of combustion than oxygen, and which will therefore show no affinity for the oxygen of the air. Of this class, the bichloride of mercury, (corrosive sublimate) and the chloride of zinc may be named.

Mr. Tillman illustrated the subject with chemical symbols on the blackboard.

The Chairman mentioned, as illustrative of the singular causes which sometimes tend to destroy buildings, that, in the University building, Professor Draper, had left on a painted table, a lens, which the rays of the sun had reached, and by which they were brought to a focus so as to char the wood of the table.

Mr. Seeley.—A naked demijohn of water has produced a similar effect.

Mr. Meigs stated that large drops of water pendent from the under side of the glass of his hot-bed, have produced a similar effect, so as to destroy all his finest hot-bed plants. Mr. Seeley adverted to Kyan's process. Sulphate of lime (gypsum) can be used to fill the pores of wood. By exhausting the air from them, the capillaries of wood can be forced to receive the protecting material, so that light timbers like basswood can be impregnated with it, and the impregnating material can be colored to taste, thus forming beautiful wood.

Chairman.—Kyanizing is not an artificial only, but also a natural process. Wood from Genesee river, is proverbially of brief duration, while the timber of other places far exceeds it in durability.

Mr. Johnson.—I have noticed that our hot air flues often reach 600° Fahrenheit, and are hot enough to boil mercury. In Manchester, England, I found an excellent system as to fires. "The law takes despotic command over that matter," consequently the fires are few and small.

Mr. Stetson, described the common hot-air warming apparatus, in parts of which the heat is from 1,000° to 1,200°; yet tin flues are employed whose soldered parts are, of course, unsoldered by the heat, and consequently our school-houses are burned out. The registers are often closed, which should never be the case. There were so many fires in San Francisco, that some people put up iron buildings, and on one occasion the people in an iron house, shut it up against a neighboring fire and perished in it with their property. In France, *pise* houses have been tried with some success. There has been an improvement in the hatchways of stores introduced in Boston, which renders them better for hoisting, and safer in case of fire.

Dr. Reuben showed the importance of prompt action in case of an alarm of fire, before the extent of burning material be too great.

The Chairman.—We have advanced somewhat in the line of our duty to-night, by calling public attention to certain points, which may, with others, lead to such legal enactments as Manchester lives safe under. We may thus hope to render some service in promoting the health and safety of our noble city.

AMERICAN INSTITUTE, POLYTECHNIC ASSOCIATION, *May* 11, 1859.

John Johnson, Esq., Chairman. Henry Meigs, Esq., Secretary.

Mr. Meigs read the following paper upon the subject selected last evening, viz.:

INK—WRITING INK.

"The writing ink of the ancients differed materially from ours. They used charcoal, with some adhesive or mucilaginous matter, and their ink was far more durable than most of our modern inks. Now we form a chemical instead of a mechanical compound. We use as a basis proto-gallate of iron, and proto-tannate of iron, which together, by oxydation, become per-gallate and per-tannate. The color is at first pale, but oxygen soon darkens the writing.

"Brande says that the following recipe for writing ink is good:

"Aleppo galls, well bruised, 6 ounces; sulphate of iron, 4 ounces; gum arabic, 4 ounces; water, 6 pints.

"Boil the galls in water, and then add the other ingredients. Put the whole in a bottle, well stopped, and shake it occasionally. After two months, strain it off, and add to it one grain of corrosive sublimate or three drops of creosote for each pint. This will hinder its moulding."

"He also says, that the great object is to regulate the proportion of the sulphate of iron to the galls. Time should elapse between the mixture and the using. Also gum suspends the coloring matter, prevents too great fluidity, and protects the vegetable matter from decomposition. Logwood and other vegetable dyes do not give a permanent ink. Lastly when ink has become so pale as to be almost illegible when written with, it may be partially restored by applying infusion of galls to it."

SYMPATHETIC INK,

Is made of metallic solutions, writings made with which are illegible in ordinary temperatures, but are rendered legible by the application of heat.

RED INK.

According to Heusler's receipt, is made of, Brazil wood, 2 ounces; muriate of tin, ½ drachm; pulverized alum, ½ drachm; gum arabic, 1 drachm; water, 32 ounces. These ingredients are to be boiled until the quantity is reduced one-half.

Carmine and ammonia make a beautiful red ink, but it is fugitive.

INDELIBLE INK FOR LINEN.

Nitrate of silver, one ounce; water, one ounce. Thicken when cold, with a little mucilage.

The place to be written upon, is first moistened with carbonate of soda liquor, and then dried, when it is fit to receive the writing.

A marking ink which can be used without the soda is composed of ammoniated solution of nitrate of silver, thickened with a little mucilage.

A black indelible ink, is formed as follows: best lampblack, 10 grains; indigo, 2 grains. Dissolve in four ounces of acetic solution of pure gluten, of the strength of wine vinegar. This ink does not suit linen, as the washing and rubbing will remove it.

INDIAN INK.

This is made of purified lampblack of the finest quality, formed into a paste with glue size, which is moulded into cakes of suitable size and shape.*

JAPAN INK.

For large quantities this is made of Aleppo galls, 12 lbs.; copperas, well roasted, 4 lbs.; gum, 3½ lbs.; water, 18 gallons. This ink is intensely black, and with some sugar added, it makes copying ink. It, however, is not durable.

PRINTING INK.

This ink is made of best clear linseed oil, 1½ gallons; resin pulverized, 6 lbs.; dry brown soap, in shavings, 1½ lbs.; indigo and Paris blue, of each, 2½ ounces; purest lampblack, 5 lbs. Boil the oil first, and burn it to the consistence of thick varnish. While constantly stirring add in the resin and then the soap; then, with a crutch, mix in the lampblack, indigo, and Paris blue thoroughly. Let it rest for a week, after which grind it in one of Bogardus' eccentric mills.

"Savage proposes as a superior black printing ink: Balsam Capaiva, 9 ounces; best lamp black, 3 ounces; Paris blue, 1¼ ounces; Indian red, ¾ ounce; dry resin soap, 3 ounces."

LITHOGRAPHIC INK.

"Lasterie's, which is the best, is made as follows: Dry tallow soap, 30 parts; mastic, in tears, 15 parts; soda, 15 parts; shellac, 150 parts; lampblack, 12 parts. When it is to be used, it is to be rubbed down with water to the required consistency, and depth of shade."

INK FOR ENGRAVINGS.

"This is made of nut, or linseed oil, with finely pulverized Frankfort black."

Mr. Meigs, having finished his paper, next read the circular of the "London Society of Arts, relating to Decennial Fairs to begin in 1861.

Dr. Vanderweyde, spoke of sepia, which is extensively used in lithographic inks, and is also much employed in coloring drawings.

Mr. Stetson, stated that in printing large letters on show bills, camphene is added to the ink to prevent its too great adhesion to the type. The brilliant reds too, which are used, are very costly. Mr. Bogardus the inventor of the mill by which all printers' inks are now ground, is a member of our Institute.

Mr. Seeley mentioned a Continental bill which he possesses, and which was written on in the last century. The writing is now in a good state of preservation. Nutgalls are used in making the best writing inks. Sym-

* This process, when repeated in Europe, does not succeed, and, therefore, cannot be the true one.—J. R.

pathetic ink may be made of onion juice; it is, however, very seldom used in the present day.

Mr. Stetson, spoke of the faded condition of the original signatures to the "Declaration of Independence," now in the United States Patent Office, at the same time that the body of the "Declaration" itself, is in a good state of preservation, showing that there were both bad and good inks in those days. S. O. Dunbar, Taunton, Mass., manufactures very good writing ink, which is black at the moment of being used.

Professor Reuben, knew of no inks which are pale when written with, but which, on standing for a few hours in the light or in an inkstand, will throw down a very decided deposit or sediment.

Dr. Vanderweyde, exhibited some drawings made with Indian ink, and some made with sepia, to show the relative value and uses of these two coloring materials in drawing.

Mr. Seeley attributed the fact of so much ink now fading, to the use of steel pens, which gives an excess of iron to the ink. Nutgalls should be well boiled to extract the tannin.

Drs. Reuben and Vanderweyde, and Mr. Stetson, agreed in considering that the oily substance remaining in the pores of the poorer qualities of writing paper, or received by the paper from the hand in passing over it while writing, is the principal cause why the inks do not adhere, particularly to the lower parts of each sheet.

Dr. Vanderweyde further stated, that the same effect will be produced by mixing milk with the ink. But that an ink as durable as the paper may be obtained by mixing a carbon ink with a chemical ink; the chemical ink to prevent rubbing off, and the carbon ink to prevent fading.

Mr. Seeley stated that the bank bills, colored with different colored inks over-lapping, have never been successfully counterfeited or photographed. Also that faded inks can be restored by moistening the paper with a thick solution of nutgalls, which is to remain on the paper until it adheres to the faded ink lines.

The Association having selected as a subject for next evening, "The Manufacture of Steel and Malleable Iron."

Adjourned.

AMERICAN INSTITUTE, POLYTECHNIC ASSOCIATION,
May 18th, 1859.

Professor Mason, Chairman. John Johnson, Esq., Secretary pro tem.

Miscellaneous Business—.Mr. Johnson remarked that as the durability of inks had been called in question, on the last evening, he had brought with him for exhibition, some manuscripts, written during the reign of Elizabeth, and in the same hand as that in which Shakspeare wrote his plays. These manuscripts showed a high state of preservation.

Mr. Seeley thought the ink with which they were written was Indian ink.

Dr. Vanderweyde thought that the ink was a chemical one, and not Indian ink as suggested.

The following extracts were sent in by Judge Meigs.

Repertory of Patent Inventions. London, March, 1859.

PHOTOGALVANOGRAPHY.

Very interesting as information to the Club, but useless to print, because contained in a work readily accessible.—J. R.

The Institute has recently received from "The Societe Imperiale des Sciences Naturelle," of Cherbourg, a present of the 5th volume of their Transactions, containing a second note by M. J. Thuret, on the Fecundation of the Fucaceæ, and the reproduction of Nostochinea, the anotomy of aerial plants of the order of orchideæ, by M. Ad. Chatin.

The regular subject of the evening being now in order, viz:

STEEL AND MALLEABLE IRON.

Mr. Seeley introduced the subject, by stating that we want light on the relation of steel to iron. Some suppose steel to be iron, which has suffered a molecular change only, and that carbon is but an accidental substance and not necessarily present in steel. He, himself, holds that steel is a true chemical compound of iron, carbon, &c., and that cast iron differs from steel in the amount of carbon, &c., which it contains in proportion to the iron. In the process known as Bessimer's, for converting cast iron into steel, the oxygen of the air is caused to combine with all the impurities which are oxydizable, which are thus carried off in slag to any extent required to form the compound steel from the compound cast iron. The great problem, however, of this process has yet to be solved, viz: "To produce a *homogeneous mass*, by throwing jets of air through fused masses of cast iron." Mr. Seeley understood that Joseph Dixon, Esq., of Jersey City, claims that he can produce steel from iron, by keeping the latter at a bright red heat for fourteen days, and out of contact with the air. He must be mistaken; there is high authority against him.

Dr. Vanderweyde.—The whole of Mr. Dixon's theory is wrong; nitrogen must be present, and yet it is so subtile that it escapes detection by the chemists in analyses. Steel is never made unless where nitrogen is present. In fact, this element performs an important part in all instances of case-hardening.

Mr. Tillman.—If I recollect aright, Professor Faraday was the first to refer to nitrogen as an element of steel. There are, I believe, records of iron having been converted into steel, by the agency of electricity. Aluminium is found as an element of Indian steel. Now the chemical equivalent of aluminium is the same as that of iron, and this relation may be very important in this connection. It may be well to add that nitrogen has the equivalent one-half in this scale.

I do not believe the combination to be atomic, as stated by Mr. Seeley, in any kind of steel; and the number of processes patented, which are diametrically opposite in chemical theory, show that the subject is not fully understood. I believe it to be nothing more than iron which has suffered a molecular change. Carbon and nitrogen are doubtless elements, essentially necessary to produce that change by their presence.

Dr. Vanderweyde.—In Belgium, there are vast quantities of coal and iron worked by an English firm, some of whose productions are worthy of remark. I have specimens of their cast iron of remarkable toughness, admitting of their being readily bent. They are, however, non-elastic. This extreme toughness, I attribute to freedom from sulphur and phosphorus. Steel is not simply iron and carbon, it is something more which is not understood. In hardening, also, there occur changes which chemistry does not explain. For instance, Indian steel is best hardened in the air. This information I derive from the second volume of Berzelius on metals. I may have been mistaken, and this may refer to Damascus steel.

Mr. Tillman.—Cast iron chills by sudden cooling, and is evidently crystalline in structure. Is not that a molecular change? If not, what is it?

Professor Hedrick.—It is difficult to understand how, in changing wrought iron bars, by the old process, into steel, the carbon could mechanically penetrate the iron. There must evidently be a chemical union between the particles of the two elements. Now a change of specific heat, indicates a chemical combination; thus 28 parts of iron and 16 parts of sulphur, would each require a certain amount of heat to raise their temperatures through a certain number of degrees. When they have chemically combined to form sulphuret of iron, each compound atom will take only as much heat as the single atom of either constituent. The phenomena of latent heat are generally referred to chemical action, but it is not correct to refer them exclusively to this cause. It is true that chemical combination is always attended with the evolution of heat, because, when two or more atoms unite to form a compound atom, the latter acquires the latent heat which its component atoms had previously possessed, and this is more than it has capacity for, therefore the excess becomes sensible.

Mr. Butler.—I think the changes are molecular, and that Mr. Tillman's theory is the correct one. In my business, I harden steel in cold water, and I believe that a piece of steel of considerable thickness could not be hardened in the air, even if carried through it by the aid of a swift-horse. Cast iron chills readily on being poured into proper forms, and, if pure and fine it becomes as hard as hardened steel. The crystalline appearance of chilled iron is always manifest towards the centre. I use three kinds of iron, known as Buckman, Scotch, and Crane, to ensure good castings. Hard cast iron is close grained, and in drilling it the drill becomes highly magnetic, much more so than in drilling hardened cast-steel The cutting edge of the drill soon becomes polished and ceases altogether to cut. In case-hardening, I have found that poor qualities of iron are soon converted, while the best rivet iron is more difficult to case-harden. I mention these facts because much loss of time and materials is entailed by our not having a record of the practical details of everyday business, without which our foundry men have to work in the dark.

Mr. Tillman thinks Dr. Vanderweyde must be mistaken as to the Berlin iron being of so yielding a nature. May there not be some other metal associated with it, which gives it that property?

Mr. Butler confirmed Dr. Vanderweyde's statement, and added that his own specimens have considerable elasticity also.

Professor Hedrick.—There must be a true chemical union between carbon and iron in steel, but the change from soft to hard steel, from non-magnetic to magnetic, together with electric and many other changes where no change of the chemical constitution occur, are properly referred to molecular changes. This term molecular change is often used without any definite idea being attached to it and apparently to cover up our ignorance of the subject. It is not an explanation to say that a molecular change has taken place. The ordinary hypotheses of chemistry are not sufficient to explain certain phenomena. These we explain by referring them to arrangements of the ultimate particles, or molecules, of a homogeneous substance whether these molecules be themselves chemical elements or compounds. Chemistry establishes the principal facts upon which the other natural sciences are built, but it does not furnish all the facts, and we want a full statement. If practical experimenters would give all the facts relating to their difficulties and failures, as well as those which resulted in the success of their operations, we should often learn more from the former than from the latter.

Mr. Butler.—We should note our failures and record them, and chemists ought to give this subject the attention its importance deserves. Our axles break; and but the other day the beak fell off one of our anvils, evidently in consequence of a molecular change in its material. In this instance there were spots of oxyd observed over the face of the fracture, for which we could not account.

Mr. Meigs.—Some persons explain the hardening of steel, by saying that "the carbon in the metal is converted into 'minute diamonds' which are embedded in soft iron, which cooling suddenly, contracts and allows the edges of these diamonds to protrude." The whole subject should have profound attention. Take a steel razor, and before using it on a cold morning, pass its blade a few times over the hand, and observe the change effected in its edge. Before it was comparatively blunt, now it is keen, but who can account for the change?

Dr. Vanderweyde had tried many solutions of chemical agents, in place of water, for hardening steel, but had obtained no satisfactory results. He also succeeded in making a large compound magnet from sheet iron, by simply case-hardening the poles and magnetizing the plates. This magnet, when completed, was found to be very efficient as well as cheap. In answer to a question by the president, he further stated, that a slight admixture of aluminium improves iron. Also, that iron and other metals, generally harden to some extent on being suddenly cooled. The metal of the Chinese gong is an exception, for it must be cooled slowly. If we put a gong into water while it is hot, on removing it, it will be quite soft. The gong is hammered in the center only, to make it hard.

Mr. Seeley.—The term "malleable iron," is only a new name for pure iron. Iron, wrought iron, and soft iron, all mean the same thing. Steel occupies an intermediate position between pure cast-iron and pure wrought iron. Cast iron contains impurities which must be removed to give us wrought iron. Silicium and other impurities are removed by being squeezed out in rolling and hammering, while the carbon is removed by being burned out, in the process of reducing. The difference, then, between wrought iron and cast iron, is that the one is pure, while the other contains impureties. In the process of steel making, carbon seems to penetrate the iron in a strange manner. Particle after particle, passes into the substance of the iron, and when about two per cent. of carbon has penetrated the iron, we obtain steel. A larger proportion of carbon would give us cast iron.

It is a general law of metals that two fusible metals united give a compound more fusible than either of the ingredients. Though carbon is not a metal, yet the compound formed by uniting it with iron, is fusible.

The *passive state* of iron is a remarkable condition. In ordinary cases, iron is readily oxydized by acids, but, when touched by platinum it ceases to be acted upon by the acid.

Dr. Vanderweyde.—The passive state of iron is due to galvanic action, and may be destroyed by heat, which restores the iron to its original state.

Mr. Butler.—To drill chilled cast iron, the drill must be used hard as it is taken out of the water. If it be put upon the grindstone to sharpen it will not cut.

Cast iron has been brazed. I have brazed wrought iron. Several years ago a wheel was broken, which was hard to replace. I bound it together with strips of iron, and placed very thin strips of wrought iron between the faces of the fractures, after which I brazed it with common brazing solder, and rendered it a good serviceable wheel. I am convinced that without the strips of wrought iron between the parts of the fracture the brazing could not be done.

Dr. Reuben.—The statements made in some of the previous remarks seem to imply a contrast between chemical changes and molecular changes. Also, the question was asked, "what is a molecular change?

I understand a chemical change to be a change of *substance*—an alteration of inherent qualities. From oxygen and hydrogen to water, there is a radical change of substance, but from water to ice or vapor there is not such a change; there is only a change in the mode of aggregation of the particles. The same holds of the change from charcoal to diamond; the carbon particles are only aggregated differently in the two substances, but the particles are identical in substance. These are instances of molecular changes, which are wrongfully spoken of as the opposite to chemical changes. They are not opposite to, but are included in the latter. The word *chemical* should of right be opposed to *physical*.

The fact mentioned by Mr. Butler, that to secure good castings it was necessary to fuse three varieties of iron together, seems to favor the theory that the differences between wrought iron, cast iron, and steel are produced by chemical changes. It is probable that a slight amount of some unknown element is necessary in castings, and by mixing the three varieties of iron together this was more likely to be secured then if only one variety of iron were used. The effect produced by the presence of a very small amount of an element is seen in the great change produced in carbon by the presence of a small percentage of iron-forming graphite. That portions of wrought iron can be brazed together, while pieces of cast iron can not, may be due to the same principle; the action of a small portion of some element. Brazing is a mode of employing the force of *adhesion*, which acts only between certain substances chemically unlike, but having some affinity for each other. Affinity is necessary to *adhesion*, but still it is quite distinct from *cohesion*. The adhesion of the brazen solder to wrought iron and not to cast iron indicated a chemical difference between the two states of the iron.

Mr. Tillman.—The Chinese are said to be able to mend cast iron without the interposition of wrought iron.

The Chairman.—Our friend, Peter Cooper, had much to contend with in his iron works before success attended him in this department of his undertakings. His attention having been called to the necessity of removing the zinc from combination with the iron, he followed the hint, his works became profitable, and his iron unsurpassed. Vast sums of money have been worse than wasted by persons embarking in the iron trade, and not taking in the bearing of commerce, and other forms of industry, upon their enterprise. Even at Scranton the fires could not have been kept in one day, had they to depend solely upon the iron trade. At Poughkeepsie, with strict economy, and close attention to the wants of the community, we are enabled to produce iron without loss to the proprietors.

On motion of Mr. Tillman, the Association adjourned to Thursday evening next, to meet in room 24.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE,
May 26th, 1859.

S. D. Tillman, Esq., in the chair. John Johnson, Esq., Secretary pro tem.

During the time devoted to miscellaneous business, the Secretary described Mr. Corvell's new method of obtaining aluminum. "He washes the clay and frees it from all foreign substances. He next dries the clay and adds to it concentrated sulphuric acid to remove sulphate of iron. He then allows it to settle, and having poured off the acid, dries the residuum, after which he heats it to about 600° Fahrenheit. Three ounces of the clay so prepared, is next mixed with six ounces of pulverized yellow prusside of potash and five ounces of common salt, and this mixture is raised to a white heat in a crucible. The result is a beautiful white button of aluminum which is found at the bottom of the crucible.

Mr. Seeley doubted the correctness of the statement that aluminum was obtained by the process described. If it were true it was important for the metal is now worth from four to five dollars an ounce. He would suggest, as possibly a cheaper and more certain process, that chloride of aluminum be employed with silver.

Professor Hedrick considered the process suggested by Mr. Seeley to be one of great importance.

Mr. Coryelle wished to ascertain the best mixture for concrete for houses.

Professor Hedrick stated that in his opinion the only ingredients necessary for concrete are lime and sand—one barrel of lime to twelve or fifteen barrels of sand being the proportions. These form the cement and rough stones may be used to any convenient extent for filling in.

Dr. Vanderweyde.—If concrete is to be used under water, the lime of which it is made, must contain some alumina, which gives mortar the property of hardening under water. Hydraulic cements take a very long time to consolidate entirely.* Indeed, no mortar becomes hard in all parts of a building without a long lapse of time. In buildings which have fallen, where the mortar had separated from the bricks, on a chemical analysis being made of the mortar, it was found to contain all the ingredients of the best quality of mortar, so that if it had sufficient time, it would have become durable and strong.

Professor Hedrick stated that when cements set quickly, carbonic acid plays but a trifling part. For foundations, where it was necessary to have the mortar set soon, he has used common mortar mixed with *cement*. He had used the kinds of mortar spoken of, but prefers coarse to fine sand. He also mixes the mortar the day before it is required for use, and works it up immediately before using, when to appearance it is nothing but sand. With proper apparatus, walls are speedily and cheaply built, and they become hard and dry in the space of one month. The stones occur in the concrete in every position and of all shapes and sizes, within moderate limits. The appearance presented by the walls is pleasant. They are smooth and perfect, and can be finished six months after being built, by giving them a coat of "rough cast." The building alluded to, was erected in North Carolina, and the weather there is as variable, and subject to as great extremes as in New York. Moisture freezing within the walls and again thawing is the chief cause of destruction to concrete walls. In answer to a question, he further stated that his walls did not crack, and that no walls will, if the foundation be good. The stones employed were of any size and shape that would fit in the box or frame used in building.

* This is not the case, when Puzzolana is used with a pure quick lime, or when the cement is made of *Septaria*. In both cases, the mixture will harden throughout, when under water, in a few days.—J. R.

The finishing coat is the same as is used on other walls. One-fourth of hydraulic cement to three-fourths of lime was used in the mortar for the base of the walls for about two feet in height, to prevent the action of capilary attraction, and so allow the upper parts of the walls to dry. I have called the attention of farmers to the value of hydraulic cements in forming *concrete* fences, the sand to be used, being purely silicious and free from loam. The mortar must be kept before use for some time, for, if we use dry lime and dry sand, there can be no chemical union between them. Wet them and a silicate of lime is formed. Several gentlemen expressed the opinion that the public should be more fully informed as to the objects of this Association, and the mode in which these objects are sought by open discussions free to the public. Accordingly, on motion of Mr. Garbanati, it was resolved "That the chair be requested to appoint a committee of three to consider and devise the best means of bringing the proceedings of this Association, more directly before the public."

The committee appointed by the chair, were, Mr. Stetson, Dr. Reuben, and Prof. Hedrick.

The regular subject of the evening being now in order was called up.

IRON, STEEL AND MALLEABLE IRON.

Dr. Vanderweyde introduced the subject by saying "Mr. President, since our last meeting I have spent all the time I could spare in seeking to satisfy my own mind as to the real nature and differences of iron, steel and malleable iron, I find more books treating on these metals, than I could read in six years. Several of these are of no value, as their information is not up to the practical standard of the present day.

Steel is a very difficult material to analyze, to determine whether it contains carbon, aluminum, or silex, &c. It is also extremely hard to determine whether there is nitrogen in steel or not. My impression is, that there is. Professor Dumas has conclusively proved that nitrogen combines with iron. I find that iron combines with almost all the metals. Gold combined with copper, makes an alloy harder than either ingredient. Copper alloyed with zinc forms brass, a harder substance. Copper with tin, becomes harder in the form of composition, as also in that of bell metal. From one to three parts in a hundred of chromium combined with iron converts it into a kind of steel resembling meteoric iron. We know the value of a small percentage of aluminum in forming "Wootz Steel," Also cast iron with ten per cent. of platinum will make a good steel.

Mr. Stetson supposed that the steel may, in the process of reduction, obtain a small amount of aluminum from the clay of the crucibles.

Dr. Vanderweyde stated that Professor Dumas took some fine iron wire, and sealed it hermetically. He then heated the wire and poured upon it a stream of ammoniacal gas, which was decomposed, and the nitrogen was found to combine with the iron in the proportion of one atom of nitrogen to two of iron, the resulting compound being a brittle and hard steel possessing magnetic properties, but being deficient in some of the usual properties of steel.

Mr. Johnson.—Mr. Eddy, the manager of the Damascus Steel Company Works, 47th street, New York, informs me that he invariably obtains perfect ingots of cast steel, by the Neville process, and of greater weight than the combined materials used to produce the ingot, even taking into account the carbon yielded by the blacklead pots which he uses. Mr. Johnson could suggest but one other source whence material could be obtained to produce this result, viz: the atmosphere yielding nitrogen.

Mr. Tillman instanced Mr. Dixon's process for converting cast iron into cast steel by the continued action of heat, a portion of the carbon being consumed, and so passing off from the cast iron, leaving it converted into steel.

Dr. Vanderweyde gave as a reason why the English manufacturers should make the best steel, that they have obtained the exclusive ownership of the best iron in the world, viz: that of Dannemora, in Sweden.

Mr. Coryelle.—Nevertheless, these manufacturers have to exercise great care, skill and judgment, to produce steel of anything like uniform quality.

Mr. Stetson.—England is peculiarly fortunate in her climate, and in possessing an abundance of skilled labor, iron, &c.; but she is unfortunate in the quality of iron she possesses.

Dr. Vanderweyde.—The English steel is uniform, because it is made from the iron of uniform quality which I mentioned.

Mr. Stetson.—The Dr. is correct, but still, in this country we possess as good iron as the Dannemora, yet we fail to make good steel because we do not manufacture on a sufficiently large scale. In the great works of England, experts are always on hand to direct the manufacture, hence success follows.

Mr. Butler.—With a proper assay office and skilled workmen, superintended by a thorough chemist, we would doubtless obtain valuable practical results from experiments on the making of steel. In England their processes are stereotyped, and they laugh at our "five minute process." We make steel, however, and good steel too; and, when the refining process is well understood, poor steel will become the exception, not the rule. About thirty years ago a lot of steel was made which proved valueless, and was laid away and almost forgotten. Subsequently, however, it was reworked and proved to be a very superior steel. Was not this effect produced by a molecular change? I believe it was. Does iron improve by age? and if so, what is the nature of the change? By which is the color of iron produced, chemical or mechanical action? Some iron will case-harden, other iron will not case-harden uniformly. What is the reason for this?

Mr. Seeley.—I regard quickness as highly objectionable in a process of this kind. We want to know the raw material to be operated upon and any such material, if it contains sulphur, must be rejected. We can ascertain with sufficient certainty what impurities are in the ore by testing it in the laboratory. The facts related by Dr. Vanderweyde in relation to the Dannemora iron and the importance of its purity for the purpose of steel-making are of great interest, and point out the true means of success in this manufacture. Pure iron may be reduced by electricity, and may be combined with other iron to obtain experimental results. In times gone by, burned sponge was much used as a specific for goitre. It was not known what the active principle was. Chemistry has shown it to have been iodine, and now iodine has taken the place of burned sponge in medicine. In like manner, let us know for certain that there is nitrogen and carbon combined with iron, in steel, and then we will soon devise a sure process for making it.

Mr. Johnson referred to the use of franklinite in combination with iron, to produce a good steel, which apparently contains neither carbon or nitrogen.

After some desultory remarks, the subject for next evening's discussion was selected, viz: "Silk and its Manufacture;" and the Association adjourned.

AMERICAN INSTITUTE, POLYTECHNIC ASSOCIATION,
June 2d, 1859.

S. D. Tillman, Esq., in the Chair. Henry Meigs, Esq., Secretary.

The following extracts from foreign journals, were read by the Secretary, together with the remarks on the Royal Academy of London.

WATER PIPES OF PAPER.

Almost every conceivable material has been used for water pipes, and now Paris gives us paper. Bitumen is mixed with a certain amount of chalk and is heated to the melting point. Paper is passed through it, and then immediately rolled upon an iron mandril of the size required for pipe, and of thickness desired. The mandril is then placed in another cauldron of pure bitumen, and afterwards rolled upon a flat stone, sprinkled with fine dust. The mandril is then drawn out, and the inner surface of the pipe is dressed with pure bitumen. These pipes are four times cheaper and five times lighter than cast iron. On trial of strength they resist *fifteen atmospheres.*

SILK

Was considered by the American Institute, from its foundation, a most important subject of research and promotion. A national convention of silk men was called in October, 1843, by the Institute. It met on the 13th and 14th. Their proceedings are contained in the volume of 1843, occupying 153 pages.

Previous to this, great exertion had been made to promote silk culture here. One of the first to aid us was the well known Dr. Felix Pascalis, who imported eggs for distribution. Then followed the importation of the great mulberry tree, *Morus multicaulis*, and heavy losses to numerous spirited citizens. Recently Europe has suffered loss by means of disease in the worm, somewhat as she has in her grapes. The time will come when, by *careful division of labor*, in many parts of our broad country, silk can be grown in quantities sufficient, both for ourselves and for export.

BONELLI'S ELECTRIC LOOM.

On the 7th of March, at the meeting of the Académié des Sciences, M. Chevreuil stated, that with the President of the Chamber of Commerce and others, he had seen Chevalier Bonelli's (Director of the Sardinian Telegraph,) electric loom, work. Its object is that of replacing the Jacquard cards, by a thin sheet of tin, on which the design to be reproduced on the fabric is figured by varnish or insulating ink. The beat up of the batten brings a metallic comb, formed of small separate teeth, into contact with the design, when some of the teeth touch the varnish of the design and others the metal.

ROYAL ACADEMY, LONDON.

The president's salary is $1,500 ; formerly it was a post of honor only. The object of the Academy is to promote the *study of the human form.* Candidates for admission must draw or model well, have some knowledge of anatomy, present a specimen of finished drawing, in chalk, about two feet high, of an undraped antique statue ; or, if of the Torso of the Theseus, or of the Ilysses, they must be accompanied by a head, hand and foot. A sculptor must send a model, either in the round or in relief, of a similar figure. Prior to all this, he must obtain from the clerk, on the written request of a member, or of artists or persons of known respectability, a *printed form*, which must be filled up and delivered with his drawings or model, at the Royal Academy, on or before the 28th of June, or 28th of December, to be submitted to the first council held in July, or January. If admitted, he goes into probation for three months, to prepare his drawings or model. Attendance from 10 A. M. to 3 P. M. He must, with his drawings or model, send outline drawings of an anatomical figure or skeleton, not less than two feet high. The living model shall be set by the visitor, and continue two hours at a time. The students draw lots for places. No student under 20 (unless married) shall be allowed to study from the model. Nine visitors are annually elected.

The library consists of valuable works on art. Biennially, gold medals given for the best original pictures, measuring about four by three feet, the chief figure being two feet high.

Mr. Seelye considered that the Royal Academy unwarrantedly slighted photography, which in its application was of such advantage to art, and gave such excellent opportunities, for studying art anatomy, to those whose circumstances precluded the possibility of their studying from the living model or from antique sculptures.

Professor Renwick stated that photographic pictures were excluded because they were produced by mechanical and chemical agencies, inconsistent with the idea of *art.* The object of the Academy was to promote true art, and not skill in mechanical manipulation.

Mr. Tillman.—Water pipes made in the manner described by the sec retary, may answer well where they are excluded from the direct action of the sun's rays, but we know by experience that paper coated with bitumen will not answer for covering roofs, where it would be subject to such action.

Mr. Seeley.—The cause of failure in the case of roofs is not to be found in the use of bitumen, for some kinds of bitumen will stand well, while other kinds will entirely fail, so different in quality are various specimens. Perhaps, if it were mixed with India rubber it would stand better.

Mr. Veeder.—Bitumen should, when laid on roofs, be sprinkled with sand, after which one or two extra coats of the bitumen should be given. An excellent artificial bitumen is left as a residuum from the distillation of coal oil. It does not volatilize at 600° Fahrenheit, consequently it resists the action of the sun. It has no taste.

Mr. Seeley.—The refuse from purifying oils with sulphuric acid, is a thick and very tough tar, well adapted for such uses.

Mr. Veeder.—The refuse from candle works is imported and distilled to obtain oil, by Mr. Everitt. Now if a use can be found for the refuse from gas works it will also become valuable.

Mr. Seeley.—I was the first person who distilled that substance, having done so about five years ago. I filed a caveat, and almost immediately afterwards the price of the material rose.

Professor Renwick stated that he was glad that he could speak on the subject of asphaltum from practical experience, rather than from scientific theory alone. He had been engaged for the whole of one of his vacations, more than twenty years since, in the search for a material capable of uniting with bitumen after the manner of the limestone of Seyssel. It was a fact, not to be predicated from mere theory, that of all earthy substances, a carbonate of lime, already impregnated with bitumen, unites most kindly with that substance, whether native or the residuum of distillations. He had found such a limestone at Caledonia, Genesee county, New York, and, on trial, it, when in combination with the bitumen of the West Indies, appeared to possess all the good qualities of the *asphalte* of Seyssel. It was tried the succeeding summer upon one of the areas of the Merchants' Exchange, and, according to his recollection, appeared to stand the heat of summer well, but cracked to pieces when the cold became intense. He had observed the same in relation to the asphalte of Seyssel, when laid in warm weather in New York, and that, if laid in cold weather, it became soft in summer. In his opinion, therefore, except for covering vaults, where the temperature is nearly uniform, no bituminous compound can be used to advantage upon roofs in the climate of New York, while in the more equable climates of Paris and London it can be and is successfully used for that purpose.

Mr. Stetson wished to learn what the common price of the metal aluminum was.

Mr. Butler stated that in Paris it was sold for thirty dollars a pound. Also that it would not burnish, but would always present a gray color.

Mr. Tillman considered that aluminum was likely to be used extensively as an alloy with other metals, as it imparts to iron, &c., some valuable properties. It is very sonorous, and would, therefore, make excellent flutes, organ pipes and other musical tubes.

Mr. Stetson wished to know how it was as to hardness, rigidity, &c.

Mr. Seeley.—An aluminum tea spoon, that I have seen, is rigid, and is as light as a piece of wood of equal size covered with tinfoil. It is becoming cheaper. It was five dollars an ounce, and is now only four. In my opinion, it will be yet for fifty cents an ounce.

Prof. Renwick stated that he had seen ingots of it, in the possession of Faraday, in London, and was informed that it was probable that the cost was about that of its weight of silver. This would render it a comparatively cheap material, inasmuch as the density is so much less than that of silver. In relation to the alloys of iron and aluminum, he stated that one of them had been known and used for ages, namely *Wootz*, or Indian steel. This was the material whence the celebrated Damascus blades were made. The composition, of course, was not known until the discovery of the metallic base of the earth, alumina.

The subject of the evening, silk and its manufactures, being called for, no gentleman was prepared to inaugurate the discussion, but several samples on the table were examined and commented upon. Mr. Butler, who has been a cotton manufacturer, described the process of manufacturing the raw cotton into cloth. In his remarks he mentioned the various degrees of fineness, and consequently different qualities of cotton. Among other numbers determining the fineness of yarn 6000 was mentioned.

Mr. Renwick stated that there must be a mistake of a cypher in the number 6000, which ought to have been 600. The latter was the utmost fineness which had been attained until within a year or two. He further stated that his wife had in her possession a hank of cotton, spun by Mr. Thackeray, the Mayor of Nottingham, numbering, as far as he recollected, upwards of 700. The number, he next stated, was ascertained from the number of hancks, each of 840 yards, contained in an avoirdupoise pound.

In relation to the cotton whence the finer threads were made, he stated that it was wholly the product of the sea islands of Georgia, and that the finer qualities had been obtained by selecting in the field the bolls of finest texture, and sowing the seed contained in them. In this way one planter had raised the price of his product from 75 a 80 cents per lb. to $2, and had on one occasion, about 30 years since, obtained, in consequence of a competition between France and England, for his crop, as much as $4 per lb.

He next stated that he had learned from Mr. Cooper, of Cooper's Island, that the growth of these very fine qualities was not as profitable as the more usual descriptions, inasmuch as the crop of the former was both less abundant and more uncertain. In consequence of this result of experience, Mr. Cooper had ceased to take unusual pains with his seed.

Mr. Renwick next stated that the sea island cotton appeared to be a degenerate plant. That its fulness appeared to increase as it approached the northern brink of its production, at the same time that the crop became more precarious; that in passing beyond the southern brink of Georgia, the staple of the cotton became too coarse. He then said, that his infancy had been spent in the house of a successful trader in cotton, his own father, who by the aid of a partner who had been bred a cotton spinner, and had been established by him in Charleston, had, in 1798, laid the foundation of a fortune, large, for the time, by the purchase of sea island cotton, and its sale in Liverpool.

Cotton being a subject of family interest, he had heard many anecdotes in relation to cotton, among them the following, for the authenticity of which he could only allege the probability of the story, but could quote no authority.

It was said, that a royalist planter of South Carolina, having left Charleston with the British army, had settled at Nassau, New Providence. Of this place, in recompense for his losses and as a reward for his services, he had been named Governor. That he had sent thrice, to his daughter married to a good whig and residing in Charleston, the seeds of the tree perennial cotton of the West Indies. That these seeds, planted in a sheltered situation and in an unusually long season, had produced plants, the seeds of which had ripened before the plant was cut off by frost. That from the latter seeds, distributed as for flowers to owners of land in more southern districts, all the sea island cotton had sprung.

Mr. Renwick finally stated, that in New Providence, and generally in the cotton growing islands of the West Indies, the influence of the sea air was felt, and that it was well known that cotton of long staple could not be grown in the United States beyond the reach of the sea breeze; that, in proof, the Santee cotton was grown from the sea island seeds upon a hilly region of South Carolina, that if its texture was finer than that of the upland cotton, its staple was much shorter than that of the sea island.

After some general conversation, the Association adjourned to the 9th inst.

American Institute, Polytechnic Association,
Jan. 9th, 1859.

Peter Cooper in the Chair, Henry Meigs, Secretary.

The Secretary Mr. Meigs, read the following papers, and translations made by him, (viz:)

CLOTH.

I invite the attention of the Polytechnic to the specimens of our American work at the beginning of our career as an Independent People—as well as to those of other nations. We have in our Library a small collection made by the Reverend David T. Stoddard, of our county, a Missionary in Persia, in 1845, who sent specimens from Oroomia, Persia, to Dr. D. Stebbins, one of our able laborers in the cause of Domestic Manufactures. It will be seen that broadcloths have been made here which are equal to the European, and that it is usual for our tailors to dress us in American cloth with an European name. We now dye as well. Some years ago we made much of the best and strongest sewing silks, which appeared in our market in the *richest Italian and other packages.*

The Institute held a Silk Convention in this City, on the 12th of October, 1843, whose proceedings occupy 153 pages of our published volume of 1843.

The following paper, written by the Secretary, Henry Meigs, was read. (Mr. Meigs pronounced its utter failure while it was being laid.)

THE ATLANTIC CABLE—A TELEGRAPH VIA BEHRING'S STRAITS.

In May, 1857, the Mechanics' Club said that the project as then proposed would fail; but the opinion was offered by Mr. Tillman that the proper route would be by Behring's Straits, and that the Czar of Russia should undertake it.

A map of that strait was then drawn by the Secretary of the Club, and is now in the rooms of the institute.

The whole proceedings are reported in the published transactions of 1847.

Great opposition was made to the proposed plan.

The Czar took up the plan some time ago, but the action thereon is not known here.

The Parliament of Canada have already passed an act creating a company to connect the East and West by telegraph wires across Behring's Straits.

Our map is drawn according to the best authority, ending with the latest survey—that by Captain Beechey. The whole distance from Cape Prince of Wales to East Cape is fifty miles, and midway between the islands Ratmanoff, four miles long, and Kruzenstern, two miles long, and a bare rock near—so that from our Cape to Ratmanoff is twenty-eight miles, and thence to East Cape twenty-two miles. From a moderate elevation on Ratmanoff both continents are at once visible. The depth of water is about 290 feet. The ice cannot come down from the Arctic ocean because the current always sets through the strait, to the northward. Here then can be laid, if necessary, a thousand wires, and thus enable the world to maintain a correspondence which would be impossible on one or even many ocean wires. We all know how difficult it is for our telegraph lines to avoid a cut when great speculation needs it. At any rate unless the telegraph cables be made highway and post roads to every body, their utility is miserably reduced. And if the lines can be made accessible to every body, millions of messages will pass instead of a few hundreds. Relations, friends and men of business all over the world will keep thousands of telegraph wires in constant employment.

The cables laid in the straits will be readily taken up for repair; the nations will protect the lines using them, as they pass through their towns; altogether affording an income greater than any national revenue from all other sources.

The 800 mile cable in the Mediterranean has ceased to operate.

Vitus Behring was a Dane—entered the Russian navy in 1707.

The Empress Catharine wanted to know whether Asia and America were united, and sent Behring there to examine it in 1725. He went overland by the way of Yakutsk, on the river Lena, to Ochotsk, crossed over to Bolchercusk, and reached Nischnel Kamschatka Ostrog in 1728, and built a small boat; coasting along Kamschatka, made a mistake as to the cape; went back to Nischnel; next year tried again, but in 1733 got back to St. Petersburg, and took command of a squadron for discovery, and in 1740 reached Ochotsk. He died in 1741 on an island called after his name.

The straits were well examined by Captain Cook in 1779. He named the western cape of America Cape Prince of Wales, and stated the distance from that to East Cape at thirteen leagues only. He traversed the sea north of the straits until stopped by ice. Our countryman, Ledyard, undertook to walk to the straits and cross over to America. He set out in 1786. He reached Irkutsk, in Siberia, but difficulties arose and the government stopped him.

Captain Beechey, of England, is the last who examined the straits. The little islands are called the Diomedes.

The ice is not heavy, as in Baffin's Bay, and it is believed that the straits are not blocked up by ice, even in the winter.

St. Petersburg is in latitude 59:56, Cape Prince William in 65:35.

The London Photographic News announces a very singular discovery by Mr. L. Scott. By means of which sounds may be made to record themselves, whether of instrument or voice, singing or *speaking*. Professor Wheatstone is said to have visited Paris, and his friend, C. Abbe Moigno, showed him the paper printed in that way. Mr. Scott is sanguine that he can, ere long, print a speech verbatim by it.

[London Society of Arts. By Varley.]

SUBMARINE TELEGRAPH.

Previous to the first attempt to lay the Atlantic cable, experiments were tried, yielding the following results, viz:

1st. No adequate result is obtained by increasing the *sectional area of the Conductor*, and that in a submarine circuit, a small wire transmits signals more rapidly than a larger one.

2d. That an insulated submarine wire conducts according to a different law from the wire of a suspended circuit.

3d. That the velocity of the transmission does not depend on the intensity of the battery.

4th. That Magneto-Electric-induced currents have the property of travelling faster than Voltaic ones—and unlike Voltaic currents, when their intensity is increased, their rapidity of travelling is increased also. The cost of the Atlantic cable was about $500 per mile. Mr. Varley believes it would be better and cost but about $80 per mile.

IRON FOR MEDICINE,

Is now ground fine and administered in place of the oxydes or carbonates we use.

COMPOSITION OF WATER—ITS DISCOVERY.

By H. Meigs.—It is admitted then, Cavendish, in 1781, discovered the composition of water. Watt's claim is 1783. Lavoisier was accused of claiming the discovery. In 1790, in the "Annales de Chemie," vol. 7, page 257, we have Mons. Seguin's memoir on the combustion of Oxygen and Hydrogen, presented by the committee, Messrs. La Place, Lavoisier, Brisson and Mons. Meusnier, stating the decisive laborious demonstration of the composition of water. This report was written by Monsieur La Place, and signed by all the committee.

MATTER.

Faraday says, "I sometime since said that matter may be viewed as having ultimate atoms as centres of forces—not so many little bodies surrounded by forces. The smallest atom of matter on the earth acts directly on the smallest atom of matter in the sun, though they are 95 millions of miles apart; further atoms, which we know to be at least 19 times that distance apart, and in cometary masses far more, are in a similar way tied together by the lines of force extending from and belonging to each."

SQUARING THE CIRCLE—AGAIN.

James Smith, of London, squares it by making circles and squares of card paper, copper, &c., and weighing them.

Mr. Tillman.—The printing of sound is not practicable.

Dr. Réuben.—I would not so positively deny the possibility, because we know the admirable sympathy between musical strings. A concord throughout the scale in a pianoforte, attends the vibration of only one of the strings. These agitations may be, perhaps, yet recovered.

Mr. Meigs.—And accurately, too, as in echo—the words are repeated perfectly. The echo may possibly yet be recorded.

Mr. Tillman was decidedly against any such theory.

Mr. Stetson.—Yet sounds are said to have been rendered visible.

Mr. Veeder deemed the opinion of Dr. Reuben of the matter as probably correct. Connect 1000 sounding boards of pianos by a metallic rod, and the concords will pass from one to the other. We endeavor to examine the undulations of light, why not much more the comparatively very slow distinct undulations of sound?

The subject of Cloth was next taken up.

Mr. Veeder.—We do not yet make best broadcloths. We use in our woollen work shoddy from Europe and from home. Shoddy is made of old wool cloth picked in pieces, the fibre of course broken much.

Dr. Vanderweyde spoke of the low wages of Holland and elsewhere, as rendering it almost impossible for us to compete even with our own great supply of mechanism in the work.

Dr. Reuben.—Cloths can be rendered un-inflammable by chloride of zinc.

Mr. Stetson.—A portion of the inquiry is durability, must we settle that quickly; return to skins and leather for our drapery? I beg leave here to correct an error of my own at last meeting relative to the yarn exhibited at the London Crystal Palace. By referring to this catalogue of articles there, it will stand corrected. Our dealers in silk goods, control the fashion of some of the fabrics imported. We prepare the styles of ribbons, &c., here, send them out to Europe, and a lucky hit, in point of style in a ribbon, often makes a little fortune to the merchant of styles. These styles are all invented between Canal street and the Battery. Female designers have been employed to invent new styles, but they are found not to be persevering enough. As to silk, 12 pounds weight of cocoons leave us but one pound of silk; there is, therefore, great waste.

Mr. Butler spoke of cotton fabrics and the power of climate and weather over the loom. Moist air is absolutely necessary in weaving cotton goods.

Mr. Veeder spoke of the durability of our fabrics. We sometimes spin our threads too hard, then size them too much, which also causes the thread to form net, which weakens the cloth. We singe the net to get a good surface for printing, which causes the cloth to look fine and good. Shoddy can be partly employed with advantage as to the appearance of the cloth. Mr. Veeder explained the manufacture of worsted thread, wool and cotton to look all like wool. The English manufacturers are perfected by the succession of sons to fathers in one line of operation. Large mills gradually grow up with the perfection of great experience. Our small mills must gradually be absorbed by large ones.

Mr. Tillman exhibited the samples of silk of the Indies, belonging to the American Institute.

Dr. Reuben.—The cloth cannot be changed by immersion in any chemical matter, with a view to render it more durable. But perhaps some process, analogous to the modern paper parchment, may be applied to cloth for strength and durability. If so, strength and durability of cotton cloth will be many times doubled.

Mr. Tillman doubted any general improvement in the durability of cloth. The Egyptians, for ages, made cloth and wore it out, so do we; fibre has but limited strength in any form of wearing.

"Gold" was selected by the Polytechnic for the next subject.

Mr. Seely observed that the efforts to hardimenlize cloth had failed; that the paper process cannot be applied to cloth; and that chloride of zinc will not render cloth even uninflammable permanently, because the ordinary washing requisite for apparel, will wash it all out. Besides, the cloth, charged with chloride of zinc, will absorb moisture, and be damp. He also stated that ammoniate of copper will answer, to some extent, in rendering cloth incombustible.

The Association adjourned.

H. MEIGS, *Secretary.*

AMERICAN INSTITUTE, POLYTECHNIC ASSOCIATION,
June 16th, 1860.

Professor Mason, Chairman. John Johnson, Esq., Secretary pro. tem.

Peter Cooper read a paper on "The Currency," its management, its past, present, and probable future, and concluded that the only safe base for a paper currency issued by banks was a specie one.

A vote of thanks was passed to Peter Cooper for his valuable communication.

GOLD

Being the regular subject of the evening, the Chairman called on Mr. Stetson to open the discussion.

Mr. Stetson.—I am not in the habit of discussing, but of bringing facts before the meeting. Gold is too important in its bearings to be spoken of without due preparation. I, therefore, prefer that some other gentleman take up the subject, and I shall speak afterwards.

The Chairman said, "gold as a measure of value is vastly important, but as an article of commerce, and as a material to be used in the arts, it is of far greater importance. This consideration then, should suggest the propriety of taking up the sources whence gold is obtained as the theme of the evening. In a good old book,, "surely," says Job, "there is a vein for the silver, and a place for gold where they find it." Seeing Dr. Draper present, I will invite him to oblige us by giving us some of his reliable knowledge.

Dr. Draper.—I have not much experience of a practical kind, in gold fields. I may, however, state that gold is gathered principally by amalgamation, and that it is always found in a state of more or less impurity. I have not devoted much time to the mechanical part of the preparation or obtaining of gold.

Professor Hedrick had no practical experience in gold digging, but thought that the matrix in which native gold is imbedded, disintegrates in process of time, and so exposes the gold, which, may under such circumstances be best procured by washing. This was probably the plan employed in the days of Job. When gold is found in veins, the rocks are pounded into fine grit and gold is separated by amalgamation. In this case the rocks from which it is obtained must be free from sulphur, or the mercury will combine to some extent with the sulphur and be wasted. To get rid of the sulphur the ores may be roasted, and so the sulphur be burned off, or if the pulverized rock be left long enough exposed to the action of the air the sulphur will be oxydized. Thus in old diggings which had been abandoned for twenty years, the ores rejected as useless, had been so improved by oxydation of their sulphur that on reworking, they were found to be valuable. Nitre is occasionally used with ores of gold contaminated with sulphur, for, being rich in oxygen, it will when exposed to heat, favor the removal of all the sulphur.

Prof. Renwick.—The general impression had been, that gold was only found in drift and alluvial deposits. This was disproved some forty years ago, by a M'Barringer of North Carolina. Gold being found on the banks of a stream on his plantation, he remarked, 1st. that it was renewed after being exhausted; 2nd, that none was found above a point in a gully which the stream had cut through a hill. He therfore sought the source of the gold on the banks of the gully and discovered a vein of white sulphate of baryta containing nodules of gold. Since that time the idea of auriferous veins has become familiar in geology. In the gold regions of North Carolina, the superficial soil is most frequently a white or red clay. The speaker stated that he came to the conclusion, that the former was derived from the decomposition of a granitoid or gneiss rock, the latter from that of a greenstone. On the surface of the fields, were to be seen what were locally called *pointers*, generally angular masses of quartz, indicating the course of the veins, of which they had been portions, Although veins were frequent and easily discovered, it did not appear that the working of them had been generally successful in North Carolina.

The mine in which he was concerned, yielded a pyritical ore. By analysis, it appeared to contain from twenty-five to forty dwts. per bushel, weighing about 112 lbs. This is considered rich for an auriferous vein. The actual products, however, did not amount to more than one-third of the analysis. He came to the conclusion that the gold was not merely disseminated through the iron pyrites, but was *mineralized*, so that the ore was a double sulphuret of iron and gold.

The gold not obtained by the first process, was to be obtained in part by a subsequent operation, after exposure to the air. In this way he had been informed that more gold had been obtained from the mass of waste than was yielded originally.

The quantity of gold found in a given weight of vein rock, is as a general rule, less than that found in drift or alluvium, For this fact, there is an obvious and simple mechanical reason. When veins are disintegrated by the action of water, the lightest portions are carried to the greatest distances; thus the earthy matter is removed and the gold left in greater relative quantity. Thus, washings may be rich, while the veins whence they derive their origin are not worth working. It has been said that quartz veins are profitably worked in California, but this has not been the case in North Carolina or Virginia.

The Chairman stated, that this idea of veins being profitably worked in California, had not only been doubted but formally contradicted.

Prof. Renwick went on to state that no earthy matter or vein rock had ever yielded in practice the whole of the gold contained it it. Even when carefully washed by hand, a gentleman engaged in mining in the Columbian province of Antiguera, had never obtained more than 50 per cent. of the gold, and thought that to get from 25 to 30 per cent. by machinery, was a great success.

The pyritical ores are difficult and costly to work. By long exposure to the air the sulphuret of iron may be completely decomposed, but the space required and the long delay have not allowed this method to be practised. The roasting of the ore, which is usually resorted to, deprives the pyrites of only one of its two equivalents of sulphur, the proto-sulphuret then fuses without decomposition.

When the gold is mixed in the metallic form with quartz or other earthy minerals the mechanical processes of crushing often bring portions of the gold to the form of gold leaf, in which state the metal floats on water. It is thus rendered difficult of amalgamation, and if not amalgamated is swept away when the mass is washed.

The only known instance in which no gold has been lost, is said to be in Russia. The gold is there disseminated through an ore of peroxide of iron. The ore is treated in a blast furnace exactly as in the manufacture of cast iron. The pigs which result are treated with dilute sulphuric acid.

Professor Hedrick called attention to the fact that there are well marked forms of pyrites which contain gold. Also that the problem for the metallurgist is to remove all impurities, sulphur &c., from the gold.

Mr. Seeley had gained much knowledge from the remarks already made. He could not find similar information in books. He would suggest that an alkaline sulphuret of silver is very difficult to remove from combination with gold.

Dr. Stevens stated that he found gold distributed throughout the soil in Illinois. Where did it come from? All the soil is derived from the higher land, from the hill country. It is therefore certain that the hills which furnished the soil, contain gold.

There have been no veins found south of Lake Superior. Some veins may exist to the north of it. His conviction is that there is at the north-west, and long before we reach the Sierra Nevada gold region, strata of auriferous rocks or original deposits. The soil of all the western states, yields more or less gold, whether taken at the surface or at a depth of five hundred feet. In some localities it may be discovered at the surface, while in other places traces of gold are found only at some depth. In Iowa and Illinois, *plate gold*, exceedingly thin, has been found.

We have more correct information on the gold found in California, than on any found in other localities. Dr. Trask, a practical man, whose information is reliable, says that the gold of California is found in three distinct veins. The first trends north and south, and if any iron is associated with this gold, it is a magnetic sulphuret of iron and not iron pyrites. The second trends N. W. and S. E., and crosses the other one. This is associated with pyritical silver, copper, and other metals. The third vein occurs in the system of upheaved tertiary rocks. It trends east and west, and crosses the other two; and is richly associated with other metals and with sulphurets. These three deposits are well established and distinctly recognized.

Professor Hedrick stated that, in North Carolina, the gold veins trend N. E. and S. W.

Dr. Vanderweyde said, "it is a remarkable and important fact that all upheavals, which have occurred at the same geological epoch, trend in the same general direction.

Mr. Seeley.—It is worthy of remark, that the sweepings, which we throw away here, pay the English to refine. Some sweepings have lately been exported and were found to pay for the trouble.

There are some facts connected with the refining of gold, which are generally known, Gold cannot, for instance, be separated from platinum by cupellation. Gold may be removed from silver, when the silver is in excess, by the use of nitric acid, In Europe, sulphuric acid, has recently been employed in place of nitric acid, because it was cheaper. One house here, now uses sulphuric acid with success in their refinings.

Chlorine will replace sulphur or any of its compounds. That is it will unite with the gold and set the sulphur free to unite with the oxygen of the air. Mr. Plattner received the Council medal, at the World's Fair, for using chlorine on pyritical compounds, and I can, on good authority, say that it has been used on a large scale in Russia, and that with profit.

Mr. Seeley.—At the first trial of the separation of silver from gold by sulphuric acid, vessels were made of platinum, afterwards cast iron was tried and found to answer well. The inside of the iron becoming coated with silver, is protected from the action of the acid.

Dr. Deck in reducing gold, uses the hypochloride of lime. Having roasted the ore he drops it into cold water to disintegrate it. He then digests the roasted and powdered ore with the bleaching powder, stirring the mixture constantly. A very large quantity of gold is obtained from the bottom of the cask in which the matters have been digested.

Plattner's process is to use *dry chlorine*, but the hypochloride of lime is preferable for some kinds of ore.

The Chairman suggests that the discussion be changed to the subject of the *value of gold*, how that value was affected by the introduction of gold from California, and what was the bearing of that event upon commerce, banking, etc.

Mr. Garbanati urged the taking up of the subject suggested by the President, as one upon which he could talk.

Mr. Tillman would like the subject to be discussed in relation to the arts.

Dr. Vanderweyde stated that the use of gold has been abandoned in medicine, because when once introduced into the system, it could not be eradicated.

The Chairman doubted whether its use was wholly abandoned, though it was true that once in the system it could not be got out, for it resists the action of all acid agents that could be employed for that purpose.

Mr. Tillman.—All metals which have high atomic weights are objectionable in medicine. There are only sixteen elements in our bodies, and *gold is not one of them*, and it is wrong to put anything into our system which is not a compound part of the human body.

Dr. Deck has a very high opinion of gold as a medicine, when used in the form of bromide of gold, and administered in epileptic cases. In his own practice he uses it with excellent effect.

The Chairman recollected that bromide of gold had been used in a case which came under his observation.

Dr. Deck did not know that bromide of gold was used out of his own practice. Iodide is dangerous in the system.

Dr. Vanderweyde said it had gone out of use, for it was found that though under its influence, symptoms disappeared, they reappeared again after some time. It should therefore be disused.

Dr. Reuben.—In surgery, gold is found to be a good caustic. What is the action of a caustic? In answer to this we may say a caustic is anything which acts like the bichloride of mercury, which will enter into chemical union with the fibre of the muscle, or which when taken into the stomach, will reduce the organic tissues to the state of inorganic matter. To understand its action, let us remember that chloride of gold is a mixture of chlorine and gold. When a compound of chlorine comes in contact with hydrogen, muriatic acid is formed, and thus destroys the tissues.

Mr. Veeder suggested the continuation of the subject "Gold," in its applications in the arts and social economy.

This suggestion being accepted the Association adjourned.

POLYTECHNIC ASSOCIATION, AMERICAN INSTITUTE, *June 23d*, 1859.

Professor Mason, chairman. John Johnson, Esq., Secretary, *pro tem.*

Professor Mason, on taking the chair, read a brief but interesting paper on the importance of the benefaction conferred by Peter Cooper, Esq., upon the public, in conveying to trustees by deed, for the use of the citizens of New York, the magnificent building known as the "Cooper Union," together with the apparatus, furniture and endowments belonging to it. He then introduced the subject of the evening, "Gold" by asking, "Why should Gold be esteemed so valuable as to be selected for a measure of value and a medium of exchange."

Mr. S. D. Tillman answered that gold, among the ancients, was highly prized on account of its beautiful color, and its quality of not rusting, or in modern terms of resisting oxydation. Very little known, in former times, about chemistry, indeed, there was then no such science. Of the sixty odd elementary substances now known not a dozen were recognized by the ancients. Air and water were simple bodies. They had seven metals, gold, silver, mercury, copper, iron, tin and lead, which they named after the sun, moon and planets; gold being of course then Sol. They had made brass by compounding the ores of copper and zinc, yet zinc, in a separate state, is not described in any accounts which have reached us. The quality of gold to resist oxygen is very important. It is not confined to gold, but belongs to the whole class of noble metals. Oxygen forms more than one-half of the whole earth, as far as known to us. When isolated, it shows great affinity for all the common elements. That gold resists the advances of oxygen and retains its brilliant color under all ordinary conditions is remarkable, and gives it a claim to stand as the symbol of both purity and beauty. The relation between light and the metals is not yet understood, but he had observed the fact, that the most important metals resemble in color the three primary rays of which light is composed. Copper, for instance, has the color of the red ray, which contains the greatest calorific power, and this metal is an admirable conductor of heat, gold resembles the ray having the greatest calorific power; iron, the ray having the greatest actinic power. Iron has qualities possessed to some extent by cobalt and nickel, yet it must be called, *par excellence*, the magnetic metal. Silver, the whitest of the metals, resembles the three rays combined, and stands pre-eminent as a conductor of electricity. Gold owing to its malleability, may be made to exhibit any phenomena of color by transmission of light.

Dr. Reuben agreed with the last speaker that non-oxydizability was a valuable characteristic of gold, but another not less valuable property was its *plasticity*. This is confounded in the books with malleability. Gold has the compactness of platinum, and is more easily worked. These qualities, added to its beauty and scarcity, must give it the position of the most precious metal.

T. D. Stetson alluded to the great use made of gold in gilding, and in protecting various kinds of ornamental work from the action of destructive elements. It was applied even to the points of lightning rods. It is of the greatest use in dentistry. It is known now to have a crystallizable condition in which it can be used without any alloy, thereby preventing the disagreeable and injurious galvanic action which result from the action of the saliva on two metals.

Mr. C. A. Seeley said it was a mistaken notion that gold was only useful as an ornament. This might be true of the diamond, which in the arts is but little used, except to cut glass, or furnish pivots for fine wheel work. But gold, if it were as cheap as lead, would be used in every business where rust was dreaded, particularly for culinary vessels. The production of gold is increasing in greater ratio than silver, and we may hope to see its relative cost somewhat lessened.

Dr. R. P. Stevens said, next to iron, gold, if we include its use as a medium of exchange, enters most largely into the business wants of man, that is, in proportion to the gross amount used. Iron and gold are the great civilizers. Iron conduces to supply the rougher and more immediate wants of society, whether natural or artificial; gold to gratify the refined and æsthetic feelings. The jeweller consumes in his art the largest amount of gold. Next comes the dentist, who uses more than all that goes to adorn the table of the rich. To American dentists the world is indebted for great discoveries and proficiencies in the appliances of this metal. Gold, as gilding, is a greater preservative of wood than either paints or oils, when exposed to the action of the weather. He remembered a sign in western New York, said to have been one of the first erected, which is now decomposed except under the letters, which were gilded. Wood from the catacombs of Egypt shows the same preservative power of gilding.

The Chairman cited cases within his observation of picture frames which appeared to have been preserved mainly by gilding.

Mr. Butler in alluding to the importance of gold as a medium of exchange suggested, the bestowing of more ornamental workmanship upon our circulating gold coin as the best method to prevent counterfeiting.

Mr. A. H. Everitt, chemist, explained the advantage of the present method of making gold coin, using only sufficient alloy to give it the requisite hardness, and still retaining the distinguishing of great weight.

Dr. Reuben said that although gold by reflected light is of a bright yellow color, yet it could be made so thin as to transmit light of various colors. The extent to which it was malleable was most wonderful. Gold leaf is made only 1-250,000th of an inch in thickness, but Faraday, by means of phosphorus, had dissolved off so much that 280,000 leaves would measure only one inch in thickness. He thought the alloy of gold used in surgery was objectionable, and as doubts had been thrown upon the value of crystallized gold in dentistry, he thought the metal aluminum, now attracting general attention, might be substituted with advantage.

The Chairman spoke of the social value of gold. It was originally introduced on account of its beauty. The ancients, with all their show of gold and precious stones, had but little wealth, and never could boast of being properly clothed. The value of gold, although nominally fixed, is constantly changing, as the cost of producing it changes. If one-half the gold now in use were suddenly annihilated, the other half would purchase all the materials which existed before, provided the people were aware of the loss. In olden times gold was produced at uniform cost and in uniform quantities, not so now, gold is more rapidly produced, therefore, more gold is required to pay old debts.

Mr. Tillman remarked, that although there was an increase in the production of gold, it did not yet, by any means, exceed the healthy demand of the country. We must have a currency that will keep pace with the increasing mechanical and agricultural products. A certain amount of some medium of exchange is absolutely essential to trade and commerce. If it is not gold and silver it will be paper, made as safe and secure as possible. We can easily count the increase of gold dollars, but are we aware that the increase of our national resources are almost beyond computation. Our water power and our coal power is quadruple that of all other nations combined. These are real wealth, yet they would soon all be controlled by foreign capitalists, could they but control the currency. Our railroads, exceeding in extent those of all other countries, and although having only bond holders, if estimated at one-half the value of foreign roads per mile, are worth a thousand millions of dollars, and their full value should not vary with the quantity of business done per month. Their value is really to be estimated by capacity, not by temporary profits. Illinois alone, if used, can produce more from her soil than the island of Great Britain. This kind of latent wealth would be sought after and secured, provided there were no special panics. But our currency does not increase with actual production. Our gold and granaries should have the same proportionate expansion. If our markets were all supplied by home manufacture, the same increase of gold would be essential to preserve uniformity of values, and prevent those periodical pressures, in which the usurers manage to completely strip the producers.

Mr. Seeley said that the color of pure gold was nearer to that of brass than of any other substance, but that we seldom see pure gold. It is always alloyed with irridum, palladium, &c., &c., which though in small quantities, give a great variety of shades of color.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE,
June 30th, 1859.

Professor Mason, Chairman, John Johnson, Esq., Secretary, pro tem.

The following extracts were handed in from Judge Meigs, the Recording Secretary:

By Henry Meigs.—Mr. Wise, the Ærenaut, is at St. Louis with a balloon, intending to come to New York. He states that he found out 17 years ago that whenever he has ascended 3 to 4 miles, he always found the wind steady from the west, with uniform velocity. He believes it crosses the Atlantic, so that he could go from California to New York, and thence to the Eastern continent.

The uniform movement of air 4 miles high, from west to east, is new. It needs more evidence; if true, it would become an excellent bearer of despatches from West to East.

THE BESSEMER IRON,

Has attained much credit. Many Engineering firms use no other for their own tools. From recent trials at Woolwich, on his iron steel, the following are the results: Iron boiler plate, 68.347; bar iron, 75.897; round steel, 162.970.

When we consider that the ordinary strength of Staffordshire bar iron is only 56,000, the superiority of Bessemer's is apparent. The boiler iron plates, $\frac{3}{8}$ thick, can be folded up cold like a sheet of paper, and though doubled over three or four times and flattened down, show no symptoms of fracture at the edges of the folds. Of the Steel, a spiral shaving about 70 feet long was entire, and more resembles wire rope than any thing else.

A gun has been made by the Bessemer process, from hæmatite iron, which is quite a marvel in metallurgy. A six inch round ingot having been run, it was then heated and rolled in the usual manner until reduced to the proper dimensions for a four inch gun. After being turned and bored, a cylinder of about six inches in length was cut therefrom, and subjected to hydraulic pressure until completely flattened; yet, notwithstanding this severe test, no symptom of a crack or fracture could be discovered in any part thereof.

SOLDERING ALUMINUM,

So difficult at first, is now done by M. Mowrey, of Paris. He prepares the edges with a mixture of turpentine, balsam copaiva and lemon juice; a jet of flame is blown along the part to be soldered; the joint is then covered with morsels of an alloy of 6 parts aluminum and 94 zinc. These being melted, adhere to the surface, and are pressed down by means of small tools made of aluminum, (or, as he calls it, aluminium).

THE NATIONAL FLAX COMPANY,

Use Cator's machine. After being lifted out of water, the flax is passed in a continuous course through pressing rollers, and round cylinders heated by steam into fluted rollers, whence it is conveyed by hand all ready dried and broken to be scutched. The operation between the water and the scutching, is done in less than fifteen minutes. One machine, in 10 hours, makes half a ton of fibre and a quarter ton of tow. The sewing is from $25 to $50 per ton.

The accompanying paper was read by Mr. Bruce on the subject of Gold production:

I have had no personal experience in any of the modes usually resorted to for extracting gold from the rocks. My knowledge is obtained from my sons in California, who have devoted some portion of their time to that object.

I have been informed by them that nearly all the gold found in the rock, or sand diggings, however small the particles, is covered with an oxyde of iron, or some other foreign substance, that adheres to the particles and prevents their amalgamation with quicksilver; and that but a small amount, less than fifty, and in some cases, not twenty-five per cent. is saved.

This arises from the defective means heretofore known and used by those engaged in mining operations, and had led my oldest son to apply his inventive and mechanical genius to the discovery of the means to remedy the existing defects, in which he thinks he has proved successful, by perfecting a machine that removes the substances with which the particles of gold are covered, combining with that process a bath of quicksilver with which it is amalgamated.

A model of this machine was sent to me with the view of obtaining a patent for it. The model was contained in a tin box that would hold about a pint, about half of the space taken up by the model, the balance contained about a pound of gold quartz rock, in small lumps of about an inch in size; some of the lumps exhibited no external signs of containing gold, and I felt a curiosity to learn how rich the California quartz was. Having a friend engaged in the Assay Office, in Wall street, I applied to him to do me the favor of having the gold it contained extracted. My favor was granted, though at the time I had no hope that more than fifty cents could be obtained from so small a quantity of the rock.

I called to learn the result of my experiment, and I was surprised when my friend presented me with a lump of what he said was pure gold, and considered it worth between eight and nine dollars, and this amount obtained from about a pound of quartz.

From this experiment, I came to the conclusion that none of the modes yet adopted, (my son's new mode included, though he says his excels all the modes in use), will ever effectually extract all the gold contained in either the quartz or sand, and that by melting alone can the whole be saved.

I have no doubt in my mind that millions on millions will yet be obtained from the tailings, or what is now treated as refuse, by this or the future generation, when more effectual means will be discovered for obtaining it.

The subject of the evening, "The Ultimate Sources of Power," being now called up, some general informal discussion occurred as to the meaning of the phrase "Ultimate Sources of Power," which led the Chairman to call upon Dr. Reuben to open the discussion.

Dr. Reuben.—When we speak of the "Ultimate Sources of Power," we mean only that the sources to which we can trace power are the last we can reach, without going to that One Great Source from which All Power proceeds—the fountain head of all power, chemical, mechanical, magnetic, and vital. In 1850, Professor Carpenter and Mr. Grove suggested the idea that power cannot be annihilated—that a force which acts once acts forever, and cannot cease to exist. The same thought has been expressed by Professor Faraday, viz; that power, force, or energy is eternal. And we are compelled to accept that thought—that doctrine—in all material things. We have a conception that matter is one thing, and force another. Now no atom of matter can be destroyed, how then can we suppose a force to cease to exist? Has there, then, any atom or element of power or force been created since matter was created? To this we are compelled to answer, no! The reasons for this answer can be found in the science of mechanics. Matter can simply convey power—it cannot destroy it. We are, therefore, compelled to refer all power, chemical, mechanical, vital, &c., ultimately to *Intelligence* as the "Ultimate Source." If, then, we accept the doctrine that force can no more be made than destroyed, we must conclude that there is no such thing as utter destruction in nature.

Professor Hedrick agreed with Dr. Reuben's views. A force which does not act is an impossibility. If a mill runs, it must throw off a certain effect, and this effect is the phenomenon due to the cause or force working or operating in the mill. If we leave out of the consideration spiritual causes, we may class all motors as causes, and the work they perform as the effects. In this sense force accomplishes nothing without having time during which to operate, and if a force operates for any time, there must be some result produced. Although the effect of electricity seems to be instantaneous, it takes some time to be produced. A force may to-day act so as to produce light; to-morrow it may produce heat, &c. What is to prevent this being the case? We know that forces act variously at various times.

The Chairman wished to know in what sense the word *cause* was used.

Professor Hedrick.—Any thing, or force, which operating in time produces a phenomenon, is a cause. The leaf which precedes the fruit is not the cause of it. Simple antecedence is not enough to establish the relation of cause and effect. Causes are the indestructible things in nature—the absolute entities—mind and matter—while effects are the phenomena, or changes of form, which occur in material things.

Mr. Tillman.—We employ in the business of life a great variety of forces or sources of power, but, I think, we may trace most of them to the sun as the ultimate material cause. To the actions of the sun is due the force operative in all forms of water powers. The force of the wind, so valuable in navigation and potent in forms of wind-mills, is due to the same climate clause. We see its operation daily in the tides. To the action of the sun is due the force which, in the Spring, quickens the vegetable world into universal life, and which stores the fruits with force to sustain the lives of men and animals. Carbon, which, in the form of fuel, is the great source of mechanical force in modern times, is principally obtained from the coal deposited, if geology be true, in obedience to the sun's action, for it is the remains of primeval forests which derived their growth and vital force from the sun. According to Laplace, the very earth itself is from the sun, and all its motions are due to his action. And here we are lead forcibly to consider that no power once in existence is destroyed.

Mr. Stetson.—I fully endorse the idea that all force comes from the sun, though there is nothing to prevent us looking higher than the sun to the ultimate cause of all things. All mechanical agency, whether from the steam engine or animal power, is obtained from the decomposition of material substances, vegetable and mineral, and all causes of decomposition or chemical action can be traced to the sun as the imparter of the power. People have ascribed all power to one or more gods, and we can not wonder that the Persians should select as their god, the sun; for if we enquire why trees and plants grow—those sources of food and shelter for man—we are compelled to stop with the sun; we can not trace the relation of cause and effect further, though our imagination may lead us to a higher ultimate cause.

Mr. Tillman.—The whole of space is filled with ether, which is the vehicle of force, and as force goes off from any centre through the ether, it may in like manner return through the same medium, and so not be lost.

Dr. Reuben.—When we speak of causes and forces, we ought to define those items distinctly. All words, in common language, are used indeterminately, but in scientific discussion they ought to be made quite as determinate as possible. Power and force are not identical. Power implies force in action. Power is any agency in creation. Niagara falls would be a motive power. But when we inquire into causes we are launched into the sea of metaphysics. To us any thing that is sufficient in giving a result is a cause. In this sense, then, chemical affinity is the first great cause that we find in operation. Added to this, gravitation gives us the explanation of the system of the Universe. In tracing the nebular theory we find, as a consequence, that when the nebulous matter aggregated heat was evolved by the play of affinities, and by the mechanical compression of the mass. When rotation ensued, fragments were driven off which became planets round the centre sun; thus all power may be traced first, to chemical action, and secondly, to the sun. Professor Thompson considers that the light and heat of the sun are maintained by the destruction of nebulous or meteoric matter falling into it continually, and that still it loses one minute of a degree of heat in 400,000 years. The sun is the great disturber. If he were blotted out all nature would become quiescent.

Professor Hedrick.—The nebular hypothesis will give us no motion. From some cause that we know nothing about, motion was obtained. In the nebulous hypothesis, it is acknowledged that motion must have had some cause, in order that matter might collect into masses and begin to revolve. Gravitation will not account for matter aggregating and commencing to revolve in masses.

Mr. Seeley protested against calling the sun a source of power. The sun is not an ultimate source of power, but is only an accidental one. We have got at no fact or well established theory, after a long evening's discussion, but have had simply the ideas of the speakers presented to us. We speak of light, heat, and electricity, as matter that we can handle, yet they are only peculiar conditions of matter, as sound is only air in motion. Sound is conveyed to our senses at a moderate rate of speed, the undulations which give the sensation of heat travel more rapidly, those of light still more rapidly, while those which we call electricity travel the most rapidly of all. In all these cases, though there is force expended to propagate the undulations, no force is lost, for this effect is returned by the same medium, and cause and effect are always equal and opposite. This may be illustrated by a spring. We use force to compress a spring, but in expanding it will give out the same amount, if perfectly elastic. In all cases of imponderable agents, or forms of undulation, Mr. Grove thinks that they are convertible. Light may be converted into heat or electricity, and vice versa.

Mr. Tillman.—Vibrations in air give sound, and according to the undulatory hypothesis, their vibrations in ether give light. There are seven distinct sounds or tones; there are also seven distinct kinds of light or colors. The latter are found to be due to three distinct kinds of waves, one of which produces the sensation of red, the other yellow, and the third blue; and these by their admixture in different proportions, give all the tints. By following the analogy between air and ether, sound and the imponderable agents, we will find that light, heat, and electricity may all be regarded as ether in vibration; one form of vibration giving heat, another light, and a third form giving electricity.

The Chairman considered that the Association was now bordering upon discussions not suited to them. The term "cause" seems an irreverend idea, and the general consideration of ultimate causes as not pertinent to the objects for which the Association is established.

On motion of Mr. Tillman, a committee of three was appointed to consider all matters of importance to be brought before the Association, and to determine the limits within which every subject is to be discussed.

The Association adjourned to the second Thursday in September, the subject to be "The Economical Sources of Power."

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE, *September*, 8*th*, 1859.

S. D. Tillman, Esq., Chairman, pro tem.,—John Johnson, Esq., Secretary, pro tem.

The following communications from Judge Meigs, were read:

THE NEW ATLANTIC TELEGRAPH,

It is said will be between the Land's End, Cornwall, and Blanc Sablon, an island in the Straits of Belle Isle, at one of the entrances to the Gulf of St. Lawrence, about 150 miles longer than the old Valentia route, to avoid the steep sub-marine mountains off the coast of Ireland. No outer coat of wires—7 copper insulated wires, with manifold insulators—outer coat, hemp. Strain 2 tons; cost half the old Valentia cable.

Lindsay is telegraphing ½ a mile across the Bay without wires.

The Atlantic cable has been recently examined, and appears to have suffered at the point indicated last year by this Club, viz: about 260 miles from Valentia, where submarine precipitous mountains were found by sounding.

If deep lines be laid, they cannot long remain sound; causes known and unknown must destroy it. It is now known that electric currents destroy their conducting wires. So true is this that economy demands their being laidwhe re they can be accessible for repairs. The land route over the world, connecting by the narrow strait of Behring, in which any number of cables may be laid at only 200 feet deep, and of course readily taken up and repaired.

THE WORLD'S TELEGRAPH, BY RUSSIA.

Russia has commenced a line from Moscow, eastward 2600 leagues, to the mouth of the large river Amoor, whose outlet is in latitude about 55° N., near the Okhotsk sea. Old stories call this river country a land of gold and promise. The banks are covered with forest—pine, cork, oak, lime and maple trees. Fish plenty—river 1600 miles long. An American steamer, called the America, ascended it some considerable distance in 1857. It is navigable the whole length. Frozen hard every winter, it is then a highway for sleds, &c., and the project is to continue the line across to America.

OCEAN TELEGRAPH.

Mr. Shaffner has obtained the bark Wyman of 200 tons, to survey a route by Greenland, Iceland, Faroe islands and Scotland. He began in 1853 the plan from Newfoundland to Ireland. He believes a 1000 mile sub-marine line impracticable in one circuit.

From Labrador to Greenland, 500 miles; thence to Iceland, 400 or 500 miles; to Faroe islands, 270 miles; to Norway, 400.

Mr. Shaffner says that he does not believe that the messages declared to have come over the late Atlantic cable, ever came!

Mr. Butler wished to know if it were possible to telegraph without wires, or through wires having breaks of considerable length.

The Chairman stated that telegraphing has been effected without wires, even in a recent storm.

Mr. Seeley had read an account of such telegraphing in the papers. At first he did not believe it, but the constant repetition of similar accounts in various papers lead him to believe that it had been done.

The use of gutta percha as an insulator must be given up, for gutta percha changes and decomposes under the weather, a fact not known at first. Vulcanized rubber is the only reliable material for covering wires, so as to insulate them. It is homogeneous, water tight, and ought to last forever.

Professor Hedrick.—Several miles of Atlantic cable were taken out West, and were perfect at first. When worked a short time, however, the coating had been destroyed. He suggests that the wire be threaded through glass beads, which might then be covered with an insulating, water-tight coating of India rubber, or of rubber and pranulated cork.

Dr. Vanderweyde objected to the use of glass beads, as they would serve to accumulate the electricity. A coating of glass should be continuous, and that is impossible.

Mr. Stetson.—A further difficulty would be that the water under a great pressure would pass through the pores of the rubber, and so destroy the insulation.

Dr. Vanderweyde.—We know next to nothing of the changes which come over materials at great depths. Cork has its specific gravity completely changed. When submerged a mile or two it comes up one and four-tenth times as heavy as water. Wood is affected in the same way.

Mr. Butler, to show that gutta percha becomes useless as a cover for telegraph wires, mentioned the fact that a water pipe of it which he used crumbled to pieces in a very short time.

The regular subject of the evening, "The Economical Sources of Power," being now called for,

Dr. Vanderweyde asked if any gentleman present knew of a form of electric motor said to be invented by a Welchman. What was its construction, or mode of action? Magnetism is proved, by well known experiments, to be caused by a current of electricity, and upon this one fact nearly all attempts to make electrical engines have been based. Electricity is not now an economical source of power, but the time may come when it will be, for we are only in the infancy of the science of electricity.

Mr. Cohen.—All our sources of power may ultimately be reduced to three heads, Gravity, Heat, and Electricity. Gravity is represented by water-power, which, according to local circumstances, we find economical. Heat, in the steam engine, we employ more generally, it being a more accessible and constant source of power than Gravity. It is independent of local circumstances and of climatic influences, or changes of the season. Electricity is not yet fully broken to the harness, but there is no reason why an agent capable of such mighty effects in nature should not become a great source of economical power; but this is in the future.

The Chairman stated that England employs three-fourths of all the economic motors in the world, but Niagara falls alone could supply twice the power now utilized in the world.

Mr. Seeley considered it important to seek some means of rendering electric power available for plowing. The steam engine though so perfect is too heavy for soft ground, but if the immense stores of electricity, proved by Faraday and others to exist in the air, earth and water, could be utilized for this one purpose, it would immortalize the inventor and benefit mankind. Power can obviously be generated artificially from coal, through the agency of heat, more cheaply than from zinc through electricity, for 6 lbs. of coal yield as much heat as 22 lbs. of zinc, and the quantity of oxygen they combine with respectively, is a measure of the power they can yield.

Mr. Stetson.—Steam power is not in my opinion more economical than water power, on the contrary water power is the cheapest form that power can be had in. In some factories warm water is wanted for special uses; the addition of a little more heat converts the water into steam, which is thus used to utilize heat that would otherwise be lost. The Niagara water power is not so situated that it can be employed to much advantage now, whatever it may be when the country is more densely peopled. The power exerted by the waves of the ocean, too, is enormous, but it is irregular and unavailable. The air engine might be mentioned in addition to the steam engine as a means of employing heat. Though it was unsuccessful in 1853, it is now said to be a success for light work. The bi-sulphuret of carbon engine, also, is worthy of further examination. Another means of utilizing heat was Professor Soloman's carbonic acid engine. The ether engine, in which ether took the place of water, belongs to the same head, for it also depended upon heat, and the low temperature at which the ether vaporizes was expected to give great economy.

Dr. Vanderweyde.—I may add to the list Dr. Drake's explosion engine, exhibited at a recent fair. One part of gas was mixed with eight parts of air, and the mixture was exploded by an electric spark. This engine should be looked into more. Of the other engine it may be said that the packings could never be kept tight. Niagara is certainly not equal in power to all the engines in the world. Its power might be utilized by canals and pipes leading it to points where it is wanted.

Mr. Stetson.—Water can never be introduced economically into cities as a source of power. The steam engine is far more economical. The high bridge costs annually in interest on the first cost, $70,000, which would pay for more coal than what by its consumption would generate power enough to pump up all the water which the city would require.

Mr. Baker.—Air might be forced through pipes to convey power in or through a city. It has been so forced for other economical purposes. Beer must be cooled quickly, and to do so a blower was employed to force a current of air through tubes over the beer. This cooled the beer down to 60° in seven minutes, though when allowed to cool in the old plan it took 18 hours.

After some further irregular discussion, the subject for next evening was selected, viz: "Telegraphing," and the Association adjourned.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE, *September 15th*, 1859.

Professor Mason, Chairman. John Johnson, Secretary, pro tem.

A sketch of the rail-road route from Boston to Troy, through the Hoosic tunnel, was presented from Edward W. Serrell, Esq., the engineer of the tunnel. Major Serrell also wished to call attention to his system of increasing the traction of locomotives by means of magnetism. The driving wheels of a locomotive are arranged as magnets, at a cost of four hundred dollars for each locomotive. A locomotive so managed was in action, and though weighing only 32 tons, it had a traction power of 17 tons, and was able to pull a locomotive not so arranged backwards, though weighing 40 tons.

Mr. Tillman considered it impossible to magnetize the wheels of a locomotive so that they should be available for the purpose named. Others had tried to do so as well as Major Serrell.

Mr. Johnson.—As time is an important element in the affairs of men, if polarity have to be induced in iron and changed in Mr. Serrell's plan, it will be utterly impossible to avail ourselves of any appreciable amount of magnetism in the time required to make it available.

Mr. Tillman.—Time is of vast importance in these machines, and many have failed through disregarding it. Vergnes, for instance.

Professor Hedrick.—I regard the whole matter as practical, but it is not well to discuss this matter until we have Major Serrell present, and actually know something about his plan.

Mr. Stetson.—The application of magnetism to increasing the traction power of an engine is of vast importance, particularly for ascending grades.

Mr. Garvey.—When the traction force is liable at any time to amount to 17 or 18 tons, a locomotive must be made of 40 or 50 tons weight. This enormous weight moving along a rail road at a speed of 20 or 30 miles an hour, is sufficient to shatter itself and the road, for the weightier the engine the greater is its own wear, and the more injury does it do the road The plan of increasing the traction under discussion is described in the papers as a "shifting polarity in the driving wheels." We know that to slide an armature from a magnet is comparatively an easy matter, but to draw it off directly is not. Is there not, then, the possibility of the wheel slipping so far as the magnetism is concerned ?

Professor Reuben.—Nicholay, of Nancy, constructed a wheel, the rim of which had one polarity, while the axle, or centre, had the opposite polarity. It is clear that, in this way, magnetism may yet be rendered useful in railway locomotion.

Professor Mason.—Our railroad interests are of such vast importance that it is imperative upon every one connected with them to examine carefully every thing offering any improvement or economy. Eight years now suffice to wear out our rails, and half that time to destroy our sleepers, and the latter must now be stronger and laid closer than formerly, to prevent the breaking of rails.

On motion, this subject was laid over until the Secretary should invite Major Serrell to come forward and explain his plan to the Association.

The regular subject, "Telegraphs," not having been advertised, a report of the "Committee on Building Materials" was read, which gave rise to the following discussion.

Mr. Stetson wished for a definition of the term marble, as the meaning given to it in the report is different from what he understood by the term.

Professor Mason.—Marble is crystalized limestone.

Mr. Garvey.—In architecture the term marble is applied to all ornamental stones which take a polish, without respect to their mineralogical classification. Polished granites, limestones, and conglomerates are thus called marbles.

Mr. Garbanati stated that most of the public buildings are built of limestone, hence they stand for centuries, while many of our buildings of sandstone are crumbling to decay.

Dr. Stevens considered the magnesian limestones as better than sandstone for building purposes.

Dr. Vanderweyde.—In Belgium there is a quarry of sandstone which was used by the Romans, and their works have lasted to the present day. The stone last well when laid in building with the strata in the natural position, but when laid with the strata vertical, the stone soon gives way. The Cathedral of Cologne exhibits in places some evidence of decay, and in observations upon this fine monument of art, we have learned the important lesson that stratified stones must, in their artificial position, conform as far as possible to their natural position in the quarry,

Mr. Tillman.—The standstones in Northern New York are, doubtless, the best building materials in our State. Limestone, in its composition, has the oxyd of but one metal, while in all other stones there are the oxyds of from three to five metals. Lockport limestone is unsurpassed, and as we go northward from the city, our marbles improve in quality. The President reminded us also that as we go down in the quarry the quality of the marble improved. I may add that the Government takes all that can be quarried at Tarrytown.

Professor Mason.—Caen stone is unfit for our climate. Already those fine buildings of it erected within a few years, are exhibiting signs of decay. Our climate is more destructive of this stone than that of Boston, or of cities farther south than ours, for here there is almost constant freezing and thawing during the winter, and not continued cold or warmth. And it is well known that alternations of freezing and thawing will disintegrate sandstone or any porous stone.

Professor Hedrick.—The architect's design for a building of sandstone will not do for one of marble. Our large sandstone stoops would not look well executed in marble. But a whole street may be constructed of marble and be in excellent taste and of noble design. Park Place is an instance of this. With its marble warehouses it will always look well and be a noble street.

Professor Mason.—A few years since, I, too, was led astray as to the durability of sandstone, while aiding to select a building for Dr. Pott's church. I now find how important more accurate knowledge on the subject is, for had I then the knowledge I now possess, we would not have selected sandstone. Short though the time is since it was erected, decay of the building stone is but too evident. The stone used for the "Times Building" and "Historical Society's Library," are worthy of observation. Watch them and you will see that long after other buildings are dry these stones retain the moisture—a sure indication that they will crumble and disintegrate.

Mr. Garvey.—I am proud of American architects. There is a boldness in their designs worthy of our admiration and encouragement. Witness Fifth Avenue as a street, and the marble hotels and St. Germain hotel as individual buildings.

Dr. Stevens.—All our sandstones contain iron, which is liable to be acted upon by air and moisture. It is important then to have some correct means of judging of the durability of stone as a building material for any purpose. Our canal locks were destroyed for want of this knowledge. Caen stone is a limestone and not a sandstone. Sandstone from Cleveland appears to be an excellent building stone. The dolomites are fine building stones if properly selected. To select them, however, requires considerable knowledge of geology, and of them in particular. Professor Henry's experiments on dolomites are satisfactory. The marbles at Hastings have been thoroughly tested before using, and all have proved to be of the best quality for building stone; and they are dolomites, i. e., they contain magnesia. Those containing sand are unfit for building purposes. The red sandstones all decompose by the action of the weather, and are also affected by the vital action of lichens and mosses. It was claimed at Little Falls, N. Y., that the dyke of basalt had hardened their sandstone. It had certainly done so, but at the same time it had so changed its character, that they had to advance towards the unchanged part to find a workable vein. The sandstone of southern Illinois, on the Drury river, is one of the most beautiful building stones in the country. It is of a warm red color, and is well suited for architectural display. There are quarries of it 600 feet thick. It contains an appreciable amount of lime, and its color is due to iron and mica. By their combination it receives a beautiful life-like color. This quarry is in the county of Union.

Athens marble has a beautiful cream color superior to that of caen stone. It is a silurian limestone, is easily worked, and resists an immense pressure. It is a compact marble, that is, does not show any crystaline structure.

The sandstones of the Western States are characterized by the ease with which they disintegrate.

Professor Reuben.—We have many causes of disintegration, air, water, frost, mosses, lichens, &c. Mosses and lichens are the forerunners of all soils, we may judge then of the liability of stones to disintegrate by ascertaining how much moisture they will absorb, how they will be acted upon by frost, or by the analogous process of crystalizing souet salt from a solution; and lastly, by the ease with which lichens and mosses attach themselves to exposed parts of the rock.

Mr. Stetson asked if the amount of absorption of water measured the liability to disintegration. There is a stone in Connecticut upon which some one, a long time since, painted some letters which are now in relief evidently from the wasting away of the unprotected stone.

Dr. Jackson.—Water does not enter marble. It requires an immense pressure to force it in.

Mr. Tillman.—The expansive action of water while freezing, is the principal cause of disintegration. Water freezing in holes in rocks will split them.

Professor Reuben.—It will be well to bear in mind that water does not freeze as easily under pressure as otherwise. Pressure lowers the freezing point, and the cohesion of the particles of stone may be sufficient to prevent the water freezing at the temperature of severest winter.

Dr. Vanderweyde.—With cohesion sufficient, and a porous structure, the water should force out through the pores in freezing without either splitting or disintegrating the stone. This may occur with some stones—certainly not with all.

The hour for adjournment having arrived, "The Telegraph" was selected as the subject for next evening, after which the Association adjourned.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE, *September 22d*, 1859.

Professor Mason, Chairman. John Johnson, Esq., Secretary, pro tem.

Mr. Garvey asked for the continuation of the report of the Committee on Building Materials.

Prof. Mason.—It has not yet been completed.

Mr. Garvey.—Pulverized flints are sometimes used with lime in making mortar, and experienced builders always employ a good sharp silicious sand. This seems to indicate that a chemical action takes place between the lime and silex.

The regular subject, "Telegraphs," being called for, the chairman urged their importance.

Mr. Seeley.—In long lines it is necessary to have relay machinery. The batteries which generate the current by which signals are given are at the ends of the lines, but when the currents are not powerful enough, we have relays at local stations. It is very important to dispense with these battery relays, and I have no doubt there can be a machine made so delicate as to take their place.

Dr. Vanderweyde.—Common electricity was tried in the days of Dr. Franklin. It is, however, unmanageable when compared with electro-magnetism. Shortly after the time of Volta, a telegraph was constructed by filling 24 tubes with water and making each one when required a part of the circuit; bubbles of hydrogen appearing at the end indicated the letter, and so words were spelled out. This was of course a very slow process. The Needle telegraph was invented 20 years afterwards. Oersted observed the vibrations of the needle in 1820. In the needle telegraph, the needle was caused to vibrate, and in doing so to strike a bell. The essential feature of Morse's telegraph is the horseshoe magnet. It had been discovered in 1825, that a horseshoe of soft iron, surrounded by a helix, was converted into a magnet while a current of electricity was passing through the helix, and lost its magnetism as soon as the current ceased. The combination of a horse shoe and a helix, conducting wires, and voltaic batteries, constitute the essential parts of Morse's telegraph.

Chairman.—What connection has the name of Prof. Ampere with the telegraph?

Dr. Vanderweyde.—Ampere discovered that a current would not only magnetize, but that two currents would either attract or repel each other.

Dr. Reuben could corroborate the remarks of Dr. Vanderweyde. The invention of the telegraph was widely different from ordinary inventions. It was in advance of the regular development of the science of electricity, and there was a reason why it should come to maturity when it did. An intense desire for rapid communication of thought was felt, which, as soon as electricity was discovered, led men to seek the agency of this mysterious and fleet messenger to convey our errands from place to place. The first invention that we have any direct account of, is that of Dr. Watson, in 1747. Over the chimneys in London, for a distance of two miles, he carried currents of common electricity. This shows that the idea of telegraphing had been in men's minds—that it is old. After various important discoveries, we come at last to the electro-magnetic telegraph. Sturgeon, in 1825, made the first electro-magnet. Professor Henry increased the power of the electro-magnet, and rendered a very feeble current of electricity available for telegraphing. In 1830, Professor Morse devised his mode of recording, which he completed in 1844: 1837 was emphatically the telegraphing age. Now, notwithstanding the many and brilliant discoveries of others, Prof. Morse deserved very great honor, for he introduced a very superior method of recording.

Prof. Mason said that Professor Morse's experiments were tried in his room in the New York University, in 1837. He had a mile of wire experimenting with.

Mr. Stetson.—Professor Morse made a telegraph practicable, and therefore he deserves great honor.

Chairman.—John Stewart Milne said that Oersted and Ampere discovered the scientific truths upon which the telegraph is based. To Morse, then, is due the honor of rendering these truths useful to us in the business of life.

Mr. Stetson.—I wish to call attention to three points in connection with the present condition of telegraphing, viz: the distance practicable, rapidity of transmission and recording, and economy. These three seem of most importance for our discussion, for we have little to do with the past except as matter of curious history. I have some matters of improvement in telegraphing now under examination which I cannot explain. I may, however, say that they relate to telegraphing to great distances even when the current becomes very feeble. To increase the effect when the current has become feeble relays have been used, because currents of sufficient intensity to be felt at a distance would melt the wires at the beginning of the circuit. The power of the wire to conduct without melting, fixes the limit of the intensity of the current. One way of overcoming the difficulty presented by weak batteries, is to employ relay magnets—that is, a weak battery attached to a magnet at a station along the line. Mr. Field told us that on landing, he received the shocks through the Atlantic cable upon his tongue. Now I think that telegraphing by receiving the shocks upon the tongue, is the most readily perceived with weak currents. The Baines, or chemical telegraph, is the next in sensitiveness. In this a sensitized paper is drawn between two metallic slips connected with the wires of the circuit, as the current passes it produces a chemical change in the paper, giving a kind of dirty stain, but when the electricity is stopped no stain is produced. The length of the stain then constitutes the letter. This telegraph is entirely independent of the magnet. The length of mark is produced by the forward motion of the paper, which is moved by clock work at a fixed speed. In every thing relating to the chemistry of the telegraph, France is ahead of every other country, as this country is ahead of all others in the mechanical part. If we can receive by the tongue, or record by chemical action, there is no doubt but the rapidity of the telegraph can be greatly increased. There are between Philadelphia and this city seven wires, perhaps nine, and if we can only get greater rapidity of recording, we may be able to do the same work with one.

Chairman.—Have you met with any signals for sentences?

Mr. Stetson.—They are quite common. On the Erie R. R., there is an elaborate system of directions printed and numbered, and to give any directions, however complex, a number is all that need be telegraphed. For instance, 27—"send a train eastward," or, 38, "send one westward," so as not to run out of time. There are but few contractions, however, which can be used with safety in telegraphing ordinary messages. Also, signals run together if we send them too quickly by the Baines telegraph; even on the tongue a hundred signals a minute cannot be distinguished. They run together and produce one continued signal.

Dr. Vanderweyde.—That difficulty could readily be got over.

Mr. Stetson.—On short lines perhaps there is no limit to speed of communication, but on long lines there is—waves interfere or some other difficulty presents itself. In a line 2000 miles long, by the old method, an hour would be required for each signal. Fifteen words a minute is about the present limit to the speed with which signals can be translated.

Professor Reuben.—By omitting one-fifth of the letters we certainly could save some time.

Dr. Vanderweyde.—There are three effects produced by the electric current—the magnetic, the chemical, and the physiological—and these are produced at different distances. In the chemical telegraph, Baines' signals can be sent farther with the same current than in the electro-magnetic one; and after Baine's ceases to act through length of circuit, signals can be received by the tongue.

There are two kinds of electric currents—one has more intensity, the other has more quantity. In the chemical telegraph more intensity is required, consequently it will work at a greater distance. Yet Morse's plan has great advantages peculiar to itself.

In 1838, a key-board having ten keys was devised, and the shocks were received through the fingers—the physiological effect being the signals. At that time it was supposed that 1000 miles was the limit of telegraphing with the electro-magnet—a few hundred miles more than that of the chemical action—and a little further than signals could be received by the tongue and fingers. Eighteen years ago it was proved possible to transmit signals across rivers without the conduction of wires. The force of a current is directly proportional to the diameter of the wire, and inversely to the length. A disregard to this law caused the first experiments to send signals across rivers to fail. The battery was too small, but when a large battery was used the needle was evidently defective. The power of the battery must be doubled if the length of the wire is doubled. But if the diameter of the wire be doubled, the power of the battery need be but one half as great. Consequently the power of the battery in the river experiment had to be increased. If I want to transmit signals across a river, I must place my plates farther apart than the width of the river, or else the current will pass through the moist ground and not across the river, for it will take the shortest course.

Dr. Reuben.—Whetston, in his experiments with a revolving mirror, found that frictional electricity did not exhibit a line at the commencement of the circuit, but did show one at the other extremity of the circuit. It, therefore, passed as a flash instantaneously at the commencement, but at the extremity of three miles of wire the flash was lengthened into a stroke in the revolving mirror, showing that it took time to pass, or that a secondary current was generated which gave a second flash, and so lengthened out the impression given by the first flash. There is then an induced or counter current produced by galvanic electricity which will account for the delay. Faraday proved that there were sparks at both making and breaking connection.

In our long telegraphs the wire, with its insulating coating, becomes analogous to a leyden jar, giving an induced quantity current every time a signal is transmitted. Such telegraphs are liable to many accidents—leakage, burning of the wire, defective insulation, &c., &c. In the case of the Atlantic cable, the constant expression from Valentia was, "Send signals sharp," which proves that there was a difficulty in sending signals eastward. It may be possible, by and by, to employ cosmical electricity, and so dispense with our expensive batteries. The upper portions of the atmosphere are charged with positive electricity, while the earth is negatively charged; our heads are in a region of positive, our feet in one of negative electricity, and doubtless some one will employ these immense sources of power, but who we know not.

For submarine telegraphing perhaps it would be advantageous to employ silver wires, as silver conducts better than copper.

Dr. Vanderweyde.—Ten copper wires will conduct as well as eight silver ones. The galvanic current acts differently in a helix from what it does when in a straight wire. In one coil of the helix, the current produces a secondary current in the coil next to it, and so on. The lengthening out of the spark is due to the discharge of the secondary current.

Some further remarks followed in irregular conversation, upon the probable ultimate success of the Atlantic telegraph, and the value of the telegraph in determining longitude, &c. The Association then adjourned, having selected Steam Plowing as the subject for the next evening.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE,
September 30th, 1859.

Professor Mason, Chairman. John Johnson, Esq., Secretary, pro tem.

The Chairman introduced the subject of the evening, by stating that the measure of our ability to farm is our ability to plow, for with adequate power for plowing, we could double the product of even the best cultivated lands. The means employed in different ages and countries for turning and pulverizing the soil, gives a good criterion by which to judge of the civilization of a people. This subject—the employment of steam or some other inanimate motor to do the heavy work of the farm—is deserving of our best study and most careful investigation. Farm laborers are men. They should be spared for lighter and more ennobling toil.

Mr. Garvey being called upon, read the following paper on

CULTIVATION BY STEAM POWER.

One of the great problems of the day is to find a method of apylying steam power to the cultivation of the soil. In the fall and early spring, the soil, being unstirred for about half a year, becomes close packed, and does not admit of seed sinking into it, of young plants spreading out their roots, nor of water and air permeating it, and giving nutriment and moisture to the plants. There are also seeds, either in growth or in the germ, which, if allowed, would overpower the young crop, and appropriate to themselves the pabulum furnished by the soil or by manures. To fit such ground for the reception of seed—to loosen it—to pulverize it so that seed may sink into it and take root—to render it permeable to air and water, so that the mineral constituents of the soil may be acted upon by these, and may absorb and fix volatile agents from the atmosphere to become food for plants—to invert weeds so that, being placed in a position contrary to their natural growth, they may die—to level the surface, or to form it into beds or hills, as may be required—all these must be done by an apparatus worked by steam, in order to completely solve the problem; and, moreover, they must be done at least as cheaply, as easily, and as effectually, as they are done now by annimal power. If any apparatus, claiming to have solved the problem, does not fulfil these conditions, its success, however great, is only partial, and there is still room for a valuable invention.

There are three kinds of engines—the locomotive, the portable, and the stationary—capable of being employed in steam cultivation; and there may, consequently, be three kinds of steam cultivation invented, each characterized, in its general features, by the kind of engine employed; though under each class there may be many modifications of parts, rendering the members of the same class as widely different as those of different classes. These varieties would be determined by the structure, form, or size of the engine itself—by the mode of conveying the power to the tools or implements with which it works—and by the nature of the tools or implements it uses.

The locomotive engine may be employed merely for traction, to draw plows or other implements after it; or it may be employed both to move itself over the ground and to work some form of revolving cultivator, or some form of spading apparatus, &c. A great objection to the use of the locomotive is its great weight, which is injurious in several respects. The moving of so great a weight from place to place consumes a very large percentage of the power; so great a weight cannot be supported upon narrow wheels on soft ground, for it would sink them into the ground, and render locomotion impossible; so great a weight upon broad wheels rolls and compresses the ground, permanently hardening the subsoil, and increasing the work of turning or pulverizing it; also, the jolting and jars which a heavy engine moving over irregular ground receives, must seriously injure, and, in a short time, destroy it. Another serious objection to the use of a locomotive is the difficulty of getting it to move up and down grade with ease—a difficulty that has not yet been overcome satisfactorily upon well-made roads, and one that is not likely to be easily overcome upon irregular ground. The locomotive engine, also, when working by traction on moist ground, is liable to slip—to have its wheels turn without its moving forward.

The sinking of the wheels in soft ground may be obviated by making them sufficiently broad, as in Fawke's Engine—by getting the engine to lay and take up sections of rails, upon which the wheels may roll, and which, acting like snow-shoes, prevent the wheels sinking into the ground, as in Boydell's engine; or by employing men and horses to lay movable tracks for the engine to travel upon, as was actually done in England on one occasion, when it was found that the laying and relaying of the movable tracks cost more than the plowing would have done; or by laying permanent rails for the engine to travel on, either along the headlands or in parallel tracts over the field, having movable bridges from track to track. These last plans, though seriously proposed, seem too cumbersome and expensive to need any remark; yet Halkett's Guideway system has met with some supporters in England.

To give the locomotive sufficient *grip*, when it is employed as a traction engine, rails may be employed in any of the ways already indicated for the adhesion of the iron wheel to an iron rail, and the friction of the one upon the other is so great that, under ordinary circumstances, the wheel does not slip; or the face of the wheel may be made rough by projections upon it; all such projections, however, offer serious impediments to forward motion, as the engine has to lift itself over them; and, when on hard ground, it is jarred as it passes over each. Or the face of the wheel or roller may be made of a material that will adhere somewhat to the ground, and that will not wear smooth. This is a neat device, and has been adopted with success in the case of Fawkes' plow; or the engine may use horse-leg pushers to shove it along, as was also tried in England to effect locomotion on common roads: a plan however which by no means succeeded.

There are four ways in which a portable engine may be employed in steam cultivation:

1st. It may be constructed so light as to admit of being drawn by a team over the ground while it works the soil by some suitable form of rotating cultivator. For this purpose a caloric engine seems to possess many advantages.

2d. It may be placed in a proper position on a field, or part of a field, where it may remain stationary until such field or part has been worked, its power being conveyed to the implements by means of cables, working round anchored pulleys. This is the plan adopted in Smith's, or the Wolston system of steam plowing, which is highly spoken of in England, but is decidedly too slow for American farmers.

3d. It may warp itself from one side of the field to the other, by means of a single cable and two grapnals or anchors, one at each side, while it draws plows, or works a rotating cultivator or spades, &c.

Or, 4th. It may draw itself from one end of a headland to the other, while a truck or moving anchor passes along parallel with it on the other headland, receiving its motion from the power conveyed (from the engine) by an endless cable which crosses the field, and to which plows are attached, so as to be drawn backward and forward by the alternate action of the cable and engine. This is similar to Fowler's plan, except that he uses a locomotive to move along the headlands.

Each of these methods of employing steam has its peculiar difficulties and defects. In the first one, two horses would be required to draw an engine of the lightest construction over soft ground, and up and down hill; and the advantage of the machine over animal power alone, would be only the difference between its work and what the team would do without it. The inventor, however, calculates that, with an engine of two-horse power, and of suitable construction, working a revolving axle, carrying tines armed with a kind of short spade towards their points, he can do the work of twelve horses, giving the work of ten horses and their attendants for the cost of fuel and repairs, pay of attendants, interest of capital, &c.

In Smith's or the Wolston method, the mode of transferring the power is indirect, the apparatus is complex and clumsy, and its success, thus far, has been but small. In the third plan, or that of the warping engine, the inventor asserts that he requires an engine of less than one half the weight, power, or cost, of any locomotive; that he avoids all indirect strain upon his cable, by getting the engine to warp itself from one side of the field to the other, by means of a single rope passing a couple of times round a drum; that the anchor at either side can be removed and passed forward six or eight feet, by one man, while the engine is travelling across the field; and that, when using rotary cultivators, he has but little strain upon his cable; and lastly, that when he is drawing plows, &c., he has the whole traction power of his cable to prevent his being brought to a stand by his wheels slipping. The fourth plan, like that of Smith's, is complex and cumbersome, and cannot be regarded as successful however highly English journals and scientific societies may speak of Fowler's steam plowing.

The only other form of engine for us to examine, is the stationary one— that is, an engine permanently located upon some part of the farm. The stationary engine possesses many advantages; it can be constructed for less cost and of greater power than any other; it may be connected, at pleasure, with mills, thrashing machines, pumps, a fire-engine, &c.; it can be worked with a smaller consumption of fuel, per horse power, than any other; and its fuel may be of the cheapest kind. But how is a stationary engine to do work upon all parts of a farm? This is a puzzling question, and we know of but one way of answering it, a way which was hinted at in a paper, read last year before a society in England, and one which a friend has had on paper and in his mind for several years. The inventor of this plan supposes his farm to be of a rectangular shape, and, regarding his engine-house as an origin of co-ordinates, he lays a tube, as an axis of abscisus, parallel with one side of the farm. Connected with this tube and crossing it at right angles, at a thousand feet apart, he lays ordinate tubes, to within one hundred feet of each side of the farm; along these ordinate tubes, and at intervals of two hundred feet, he places plugs or taps whereby a connection can be made, at any time, between the tubes and the surface. Through these tubes, then, he conveys the power of the engine to any of the taps or plugs, either by compressing air into them, or by exhausting them; and, to complete the connection between the engine and the implements, he attaches a hose pipe, five hundred feet long, to the tap, and stretches it out to its full length, or half way to the opposite tap in the next ordinate tube. The extreme end of this hose-pipe is attached to a drum upon a hand-truck, so that it can be wound up or paid out at pleasure, by moving the truck towards or drawing it from the tap; then an ordinate hose-pipe, one hundred feet long, is attached to the axle of the drum on the truck, so as to be connected with the other hose, and therefore, with the pipes underground; the other end of this ordinate hose-pipe is attached to a drum on a wagon, so as to be connected with an air engine in this wagon, and so that it is wound up as the wagon approaches the truck and is paid out as the wagon recedes from it. The cultivator engine, then, is worked by air instead of steam, and is employed to turn rotary cultivators. This wagon, with its engine, cultivators, &c., is drawn over the ground by a horse; and the cultivator, while in action, works the ground to the width of six or eight feet, and to any suitable depth.

There are many details which cannot be gone into in a single paper, we must, therefore, leave the subject for the present.

The Chairman seeing Professor Mapes in the room, called upon him to offer some remarks upon steam plowing.

Professor Mapes.—The reason why we plow is that the earth to produce a crop of vegetables, must be permeated by the atmosphere. Earth settles and becomes compact and hard when exposed to the action of rain and dew, consequently neither rain, dew, nor atmospheric air can penetrate it and supply moisture and nutriment to the roots of plants. The result is that plants perish for lack of moisture. On the contrary, if we subsoil the land well we never lose crops by draught. There is always enough hygrometric moisture in the air to sustain the growth of plants, if the air can get to their roots and to the cold earth surrounding them, there to be deposited, as we constantly see it deposited upon water-pitchers and other cold bodies, in the dryest seasons. In like manner, ammoniacal gases and other gases and vapors which supply nutriment to plants, are brought into contact with the soil, by which they are absorbed to supply food to the growing crops.

At this point, Mr. Fawkes, the inventor of the steam plowon exhibition at the Fair, having come in, was called upon by the Chairman to explain the construction and operation of his plow. He declined doing so, stating that he would find it more difficult to address an audience than to invent a steam plow. After some solicitation, he, however, came forward and answered all questions relating to his invention which were put to him by the Chairman, by Prof. Mapes, and by several members of the Association. The substance of all his answers being already published in the account of his plow as exhibited at the Fair, it is unnecessary to repeat them here.

On motion, it was resolved to continue the subject of "The New Inventions at the Fair," for the next evening, after which the Association adjourned.

Polytechnic Association of the American Institute, }
October 6th, 1859. }

S. D. Tillman, Esq., in the chair. John Johnson, Esq., Secretary, pro tem.

Mr. Seeley hoped that, if there were any exhibiters present, they would come forward and explain their articles to the Association. No one responded to the invitation.

Mr. Tillman then called attention to the only specimen of a rotary engine in the Fair. He had seen but one on exhibition, and yet he considered the invention of a reliable rotary engine a desideratum. The air, or caloric engine, too, deserved examination.

Mr. Bruce observed an apparatus on exhibition which was intended for manufacturing gas from wood. He would like to obtain information on the practicability and economy of the manufacture.

Mr. Butler considered the wood gas as by no means economical for city use, where wood is dear and coal cheap, in comparison, even if the gas from wood be equal in illuminating power to good coal gas.

Mr. Seeley considered the apparatus required for the manufacture of wood gas as too expensive for private use—too difficult to be operated, and not in any sense equal to other and better sources of illumination. For city purposes, it was not at all adapted. Coal gas was better and more cheaply procured.

He wished to start a discussion, and would, therefore, offer a few words on the *Hot Air Engine*. He considered it by far the most important novelty at the Fair, because it can be applied to so many uses where steam is inapplicable. We do not want a steam engine to work a few sewing machines in a factory, or to do the small amount of work required on ordinary farms, nor in many other places where a small amount of power is required. For all such places the Caloric Engine seems well adapted. It requires little attention—only to keep the fire burning—and is a reliable source of power when only light work is to be performed. Doubtless with the same amount of coal more power would be generated in the steam engine. Its economy, therefore, is not to be looked for in the consumption of coal, but in its requiring little or no attendance.

Mr. Stetson.—The Caloric Engine is worthy of study and improvement, for, though not as economical as the steam engine in the consumption of fuel, it is much needed where a small amount of power cannot be obtained without a distinct engine. In every third house in our large cities, power is wanting in small amounts which it would be absurd to fit up separate engines for; and in such cases, economy of fuel is only a secondary consideration to the employment of a cheap motor in place of manual labor. To a large steam boat company a saving of fuel amounting to 3 or 4 per cent. would be important, but such is not the case where only a small amount of power is wanted. The Caloric Engine uses about ten pounds of coal per hour for each horse power. This is not economical, yet it compares favorably with some small steam engines. Steam engines use from 3 pounds to

10 pounds of coal per horse power per hour. A more important question than that of economy of coal, however, is that of their duration. If they are expensive for repairs and of short duration, then, indeed, they labor under fatal disadvantages. We want reliable information on this head, for many persons consider them very short lived and expensive, the parts burning and wearing out rapidly. The nominal horse power, too, seems to be exaggerated, and every three horse power engine may be regarded as about a three man power one. Nevertheless they are useful in printing offices and in places doing similar light work.

Mr. Baker.—The cost of a caloric engine is too serious, and there seem to be too many wearing parts as they are now constructed, yet there is no doubt but they can be employed in many places with advantage, particularly if they are safe and cause less risk in insurance. There are many places where a steam engine could not be erected, and in which a caloric engine would do the work well. A man, too, who takes care of a caloric engine can give a large portion of his time to other matters about a factory or workshop.

Mr. Butler would like to hear some remarks upon the wood working machinery on exhibition. It seemed vastly improved as compared with that exhibited on former occasions. Hamilton's wood moulding machine seemed a very perfect and ingenious application of machinery to the production of ornamental forms. Crosby's blind wiring machine and his mitering machine seemed admirable labor-saving instruments. The one wired the slats of blinds with much precision and despatch, and the other cut right-angled miters on mouldings with perfect precision, cutting right and left at the same time when required.

Mr. Garvey considered the moulding and carving machine alluded to as one of the greatest inventions of the age for the advancement of the building art. By the aid of Hamilton's machine, Gothic tracery could be carved with a degree of exactness unattainable by hand work, and at a small fraction of the cost of the same work when carved by hand. The arrangement of the cutting edges in the mitering machine, he considered admirable. By using knives instead of saws, the miter was cut as clean as if planed, and by having one part of the knife commence cutting before the other part, he thought the fibers of the wood would be cut more easily than if the knife came square down at once. The blind wiring machine worked admirably, fixing the slats on the rods with such rapidity and regularity, as must save half the expense of the work as executed by hand.

Mr. Stetson inquired whether Spalding's glue, which was on exhibition, would stick, and if any one present had experience in the use of it.

Mr. Butler.—It will stick. I have asked Mr. Spalding if he had a patent for his glue. He said he had not, that he relied for a monopoly of the business upon advertising abundantly, being the first in the field, and supplying the best article. He saw that there was such a thing wanted—a cement always liquid—which could be employed to do all sorts of repairs about house. Such a thing had long been known and used in England, and he improved on the recipe and introduced a superior article.

Mr. Seeley.—Common glue dissolved in any acid will always keep liquid. It will not have as great adhesive force, however, as common glue. There is a marine glue on exhibition—said to be made of glue and India rubber —which does not answer to the qualities ascribed to it by the inventor. Boxwood being expensive, some experiments were tried to stick a veneer of boxwood on a block of cheaper wood for engraving. On wetting the compound block, however, the pieces separated. Shellac is perhaps the best marine glue we have.

Mr. Butler.—I have found great difficulty in making emery wheels for our works, but I now learn that a party has made such wheels solid of emery, cemented together with vulcanized India rubber. Our plan was to use an iron core, and fix the emery powder to its surface with glue. A little salammonia helps the glue to adhere to the iron.

Mr. Stetson.—Very few understand how to use glue. The wood should be heated before the glue is applied, both to expel moisture and to prevent the glue chilling too soon. Thin glue should be used and be applied in repeated coats, each being allowed to dry well before another is applied. The last coat then should be of strong glue, and the job will be well done. It will stand a strain of from 300 pounds to 800 pounds to the square inch.

Mr. Garvey considered it an error to use thin glue for joints, &c. It is well established that a viscid liquid is more sensitive to capillary attraction than a thin one. This is shown in the florid complexion of those who have thick rich blood, and in the sallow complexion of those with thin, watery blood. The capillary blood vessels of the skin can take up the one and do not take up the other. When well seasoned timbers with true joints are fitted together with glue of a thick consistency, they invariably make good work, at least in my experience.

For purposes where glue is required to withstand moisture, it is customary to boil the glue in linseed oil instead of water. The glue is steeped over night, and the softened cakes are then boiled in linseed oil, using the same amount of oil that would be used of water for other purposes. This preparation is an excellent marine glue, and in extensive use.

Mr. Hedgeman said, I am a piano maker and in my business we require the strongest and best glue, and we always use thick glue.

Mr. Seeley.—There is a mineral paint on exhibition, but no explanation of its peculiarities or chemical nature is given. Any other clay or dirt will apparently answer as well for paint.

Mr. Stetson.—For preventing rust there are two forms of paint now being introduced pretty generally. Butcher's, of Philadelphia, and Ellery's, of New York. Butcher uses India rubber, Ellery gutta percha; but practically there is no difference between them.

Mr. Haskell.—Ellery's has an advantage in using gutta percha. It dries in about the same time as ordinary linseed oil and white lead, and gives a good body for covering.

After some general conversation on the nature of white lead and its uses in painting, the mode of adulterating it with sulphate of barytes, &c., &c., and upon the modes of applying paint to roofing, the Association adjourned, having resolved to continue as a subject the "Novelties of the Fair."

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE, *October 18th*, 1859.

S. D. Tillman, Esq., Chairman, pro tem. John Johnson, Esq., Secretary, pro tem.

The numbers present being smaller than usual, gave rise to some comments from several members upon the apparent neglect of the secretary in not advertising the meeting. Accordingly, on motion of Mr. Seeley, a committee of three, viz. Messrs. Seeley, Garbanati and Garvey, was appointed to confer with the Trustees, in order that the meetings might be regularly advertised for the future, and proper provision be made for having them correctly reported.

Mr. Garvey, to open the discussion, called attention to Parkhurst's saw mill. The mill was intended to supply all the wants of a new settlement. It, therefore, could saw lath, shingles, scantlins, bearers, and in short all the forms of lumber used in raising the houses and workshops of a new settlement.

Mr. Seeley.—The feeding apparatus is the peculiarity.

Mr. Garvey.—There is a peculiarity in the mode of adjusting the bed at sight, so as to cut a thin or a thick board, or one tapering, being thick at one end and thin at the other. Also, the log can be put on centers so as to saw the facets on the frustum of a pyramid of any number of sides, and of any desired taper. This would be of use for preparing wooden pillars or columns, giving an inexpensive mode of producing a nice architectural effect.

This saw mill costs about $450, and requires from 8 to 12 horse power to work it at full work.

Mr. Seeley.—This machine is desirable, as it enables a man to prepare all the lumber he requires for building, but where several machines can be worked it would not be as economical as the ordinary mills. It is always best, when possible, to have a division of labor, and let one mill saw laths only, another shingles, and another heavy lumber. This mill is intended only for use in new settlements where regular saw mills are not already established, and there it would, no doubt, be useful.

Mr. Hoagland exhibited some specimens of the mineral paint alluded to on the last evening, It is found in New Jersey, near New Brunswick, in an old mill pond. It is formed by the decomposition of the rocks of the locality, but evidently has some oxyd of iron in it and a quantity of decomposed vegetable matter. It is free from grit, and is fine enough for mixing with oil as it is obtained from the pit. When the bed of mineral paint is pierced with a stick a considerable quantity of gas escapes from it.

Dr. Stevens.—What streams fall into this pond?

Mr. Hoagland.—None. Rain is the only water which has access to it. Some seasons one half inch is deposited in the pit, and other seasons as much as one and a half inches,

Mr. Seeley.—Do you know its chemical nature, or does it differ from fine clay?

Mr. Hoagland.—I do not know its chemical nature. The coloring matter is evidently oxyd of iron. One gallon of oil will make 15 pounds of paint fit for use. We grind 23 pounds of paint in one gallon of oil, making thereby 30½ pounds fit for market. Clays will not make paint, so this is not a clay. We use this paint for printing on our cards. There are about 50,000 tons of this paint in the pit, and it can be supplied dry and pulverized for $30 a ton. It is of lighter color than the spale from which it is derived, but grows darker by age when used as paint.

Professor Hedrick.—It is manifestly a recent formation, probably not over one hundred years old, for the mill dam cannot be over that age. The iron is manifestly a sesqui-oxyd, which accounts for the paint getting darker as the oxydation goes on.

Dr. Stevens.—This is an interesting matter to examine scientifically. A geologist and a chemist ought to examine the locality and analyse the paint. It seems to be a formation of iron deposited by water, and acted upon by decomposing vegetable matter, similar in every respect to bog-iron ore.

Mr. Garvey called attention to Grey and Wood's plaining machine, which is remarkable for simplicity and the ease with which it is adjusted. The mode of clamping the lumber, too, is excellent, and the machine was considered by him admirably adapted for use in the carpenter's shop.

The Chairman called for the observations of such gentlemen as had examined the steam plow of Mr. Fawke and seen it in operation.

Mr. Fisher considered those remarks as necessary, for newspaper reporters in general are not competent to form an opinion upon the excellences or defects of such a machine. It requires scientific men to do so.

Dr. Reuben said he had not made steam plowing a special study, but he considered Mr. Fawke's plow as a complete success. In the trial at the Fair it labored under great disadvantages. The ground was so small that it had hardly room to turn. Then the ground was so full of stones that the plows got broken. Nevertheless, it turned in an exceedingly small circle, went backward and forward over plowed or unplowed ground with perfect ease at the will of the operator, and when plowing it turned eight furrows in a proper and finished manner, moving along at the rate of four miles an hour. If the furrows were somewhat deeper the work would look better, but a day may come when some more perfect form of cultivator will supercede the plow, and disintegrate the ground more perfectly. This machine is admirable. It is so simple and all its arrangements are so perfect. We should feel thankful to Mr. Fawke for accomplishing so much.

Dr. Stevens considered the question of steam plowing as one of vast importance to the West. There is more land now ready for cultivation by some such power as steam, than was ever cultivated at any one time by man; and there is, consequently, the greatest fortune awaiting the successful inventor of a power plow—worked by steam or some other motor—that ever any individual possessed. Even should it cost as much per acre to plow by steam as by animal power, still the possibility of doing all the plowing required at the very time it is needed, would give steam plowing a decisive advantage.

Mr. Seeley.—If the subject of steam plowing is to be discussed, some one should prepare an abstract of all that has been done in the matter both here and in England, so that we may know exactly the state of the mechanical problem as it now stands. The idea of working the soil by steam is not new, and we should have information as to what has already been accomplished.

Professor Hedrick.—There may have been made some crude inventions, bearing on this subject, thirty years ago, but then a new invention is like an animal in so far as it requires time in which to grow to maturity. Seldom has a first inventor perfected the machine which he designed to produce. That has required the successive labors of several minds.

Mr. Garbanati.—It is cheaper to consult books than to try experiments. It would, therefore, seem to be ordinary prudence to ascertain what had been attempted and accomplished by others, rather than to begin from the first to invent all details. Mechi, of London, uses steam for cultivating his farm.

Dr. Reuben.—I agree with Professor Hedrick that inventions require time to mature. The problem of steam locomotion on common roads is in this particular very similar to that of steam plowing. Both are now being satisfactorily solved. Fawkes has satisfactorily solved that of plowing, and Fisher that of locomotion on common roads.

Several gentlemen present spoke in high terms of the performance of Fawkes' plow. The drum acting as a driving wheel, and preventing its sticking into soft ground, was looked upon as a masterly device. After some further conversation on steam plowing, the Association adjourned, having determined to continue the subject of "Novelties at the Fair," for next evening.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE, *October 20th*, 1859.

S. D. Tillman, Esq., Chairman, pro tem.

The subject of the evening being "The Novelties of the Fair," exhibiters were invited to come forward and describe in full their articles.

Mr. Garvey stated that he was much taken with Stelle's Phonophorus. This instrument, as its name (derived from φωνη, a sound, and φερω, I carry), signifies, is intended to convey the sound of a speaker from the rostrum or pulpit to any seats occupied by deaf persons, so that they may enjoy the eloquence and instruction of the orator or preacher, as well as those not afflicted with defective hearing. It consists of three essential parts—1. A sound contractor, which is placed within a sort of desk or box fixed in front of the speaker, and which is formed on the same principles as a large ear trumpet; 2. A tube, or tubes, to conduct the sound to the auditors; 3. An ear-piece, which is at the extremity of the tube, or branches, when several are used, and which, being held within the ear, enables the deaf to hear the contracted sound.

The instrument on exhibition enables a person at the distance of fifty feet, to hear distinctly any ordinary conversation carried on at the rostrum, even when all the confused noises of the Fair are at their height.

Mr. Stelle.—As far as I have tried the phonophorus, I have never found it to fail. It conveys the sounds with such distinctness that the deaf can enjoy all the advantages of public worship, provided seats be fitted up in churches especially for them, and have pipes from the phonophorus to each person.

Mr. Seeley.—The principles upon which this instrument is constructed are correct. Sound can be concentrated and can be conveyed to a distance, when the force of the undulations is not allowed to dissipate itself. The reason why sound becomes weaker is, that all forces or influences emanating from a center, in all directions, become less intense as the square of the distance increases; because the surfaces of spheres vary as the squares of their diameters, and any influence passing off from a center, in all directions, is expended upon successive spherical surfaces. But when the sound is not allowed to expand its energy in all directions, but only in one, it is obvious it will preserve a greater intensity for any given distance, and consequently can be conveyed much farther.

It may be well to inquire into the practicability of connecting the phonophorus from some fashionable church with our private dwellings, so that we might hear sermons at home, and not be compelled to wade through snow or dirt. Then, indeed, a man, instead of "worshipping under his own vine and fig tree," could turn on the Gospel as we do water or gas. Not that I would hint that any fashionable preachers ever supply us with gas.

Mr. Tillman.—The apparatus of the "Invisible Lady" was constructed on principles similar to this. A hollow ball was suspended by wires with a square frame. Four trumpets projected from the ball towards the four sides of the frame. In one side of the frame there was a tube opening opposite a trumpet, and leading down through the leg of the frame and off to an adjoining room, where a lady was concealed in such a manner that she could see the parties consulting the Invisible Lady. When any one whispered through one of the trumpets, the sound was conveyed to the lady in the adjoining room who returned an answer, which, proceeding from the suspended ball, and no connection being seen between that and any other place, gave the impression that a lady was inclosed within the ball.

Professor Reuben.—Even when the ear—the proper organ of hearing—has been injured by disease or accident, it is possible to have the sensation produced through the sides of the head. Indeed the whole side of the head is capable of conveying sound, and by suitable devices the defects of the ear may be overcome, and a language may be devised for those afflicted with the worst forms of deafness. The undulations conveyed by the phonophorus might thus be made perceptible to the totally deaf of our Asylums.

Mr. Garvey called attention to a fan-blower, or rather screw-blower, for creating an artificial blast. The peculiarity of the screw is that the blades are so carved as to prevent the development of centrifugal force in the current of air, consequently the whole force is expended in driving a column of air along the sleve, pipes, &c., to the place where the blast is required. It works well, and occupies but little space.

Mr. Johnson had also examined the blower alluded to, and admired it as a very efficient apparatus though by no means the best he was acquainted with. There is one in use at the Northern Foundery, in Jersey City, which he considered the best he had ever seen, for all the force impressed on the fans is communicated to the air, which cannot escape in any direction but that of the blast pipe.

Professor Hedrick stated that he had examined an axle-box for rail-cars, which was fitted with friction rollers in an ingenious manner. In theory, at least, the friction of the axle must be reduced to almost nothing by this apparatus. Instead of slipping along the sides of a hole, the axle rolled upon hardened steel rollers, which were loose in the box, but were prevented rubbing one against another by small rollers pivoted between them. Such an arrangement can be applied either to rolling axles or to the shafting of machinery; and it is indifferent which shall revolve—the shaft or the box.

Mr. Garvey considered that, if the box rotated, the whole weight of the shaft would have to be lifted through some small distance as each roller passed under it, and that there would, consequently, be a destructive vibration caused by the alternate rising and falling of the shaft, in addition to a very considerable waste of power or enhancement of friction. On the other hand, if the shaft rotated, it would be either directly on the top of one roller or between two. In the first case it would wedge that one roller between the two smaller rollers adjoining it, and so increase the friction enormously; or, in the other case, would wedge two of the rollers apart, and so increase the friction far beyond what theoretical reasoning would indicate. In any case, the rollers however hard they may be, would depart from the true cylindrical shape while under pressure and there would be a loss of power, which the inventor has not taken into account, in constantly altering the shape of the rollers, however slight the alteration may be. In fact there is no such thing as absolute rigidity in nature. When a force is impressed upon any material body, it will produce an effect in the direction of its action, and which will be determined in amount by the relation between the impressed force and the resistance which it meets. Unless, therefore, the resistance be infinite, there must be some resultant.

Professor Hedrick.—In my remarks I have taken into account the mathematical theory alone, and have ignored the physical properties of the materials employed, because I believe the hardened rollers, box, &c., to possess such a power of resistance to compression, that any force employed in driving machinery, and likely to be brought into operation upon them, would have absolutely no effect upon them. The shaft, then, and box, being perfectly concentric at any point in the revolution, will be so throughout, and there cannot be any lighting of the shaft as a roller passes under it. In like manner, the large and small rollers being so arranged that, if one of them be subject to more friction than another, it must move on and allow the next to take its place, it is obvious that they cannot get wedged as stated.

Mr. Hoagland.—There is some misunderstanding as to the arrangement of the rollers. They are not held by the box, as Mr. Garvey seems to think, they are secured between two discs within the box, and these discs move with the rollers. The axles on which the small rollers turn, are riveted to the discs mentioned, and then the larger rollers are placed loosely between them. The result is a perfect annihilation of friction. Why the box on exhibition, though crudely made, will rotate for twenty minutes after receiving one impulse. The traction power required on railroads would not be more than one-tenth of what it now is, if these anti-friction boxes were in use on all the freight and passenger cars. It is a magnificent invention, and the exhibiter ought to be regarded as a public benefactor.

Mr. Tillman.—If these great results could be produced, every railroad company would employ this invention, for the economy would be counted by millions of dollars. But the fact that it has been invented some years and has not yet been extensively employed any where, leads to the belief that there are some practical difficulties. Indeed friction rollers of all kinds have fallen into disuse among machinists, because they have not acted up to theoretical expectations, and they introduce some complexity—a thing to be avoided as far as possible in machinery.

Mr. Stetson considered it more difficult to introduce good inventions into use than the last speaker intimated. All the greatest inventions ever made had difficulties thrown in their way by parties having vested interests, and it is no measure of the excellence or worthlessness of any thing, whether it is extensively employed or not. Inventors generally are neglected, and their inventions despised while they are living. After death their inventions, however, are often found to be invaluable. It should be our pleasure, as it is our duty, to encourage every man who contributes to the advance of arts or science; and no remarks ought to be made likely to discourage inventors or injure their property.

After some further desultory remarks upon the anti-friction box, and other articles on exhibition, the Association adjourned.

In consequence of many members being engaged as Judges at the Fair, the attendance of speaking members was rather small, but the room was filled with exhibiters and strangers.

Polytechnic Association of the American Institute, October 27th, 1859.

S. D. Tillman, Esq., in the chair. Mr. Haskell, Secretary, pro tem.

Miscellaneous business having been disposed of, a very eloquent paper on "the Metamorphoses of Iron, or its ores in different geological epochs," was read by Dr. R. P. Stevens.

Setting out with the declaration that modern geology teaches the law of "the stability or instability," he illustrated his position by reference to the continual changes taking place in bodies, leaving it doubtful whether any "molecule" of matter had at present the precise "form," "association," and locality it had originally.

His position was mostly illustrated by reference to the changes produced by "pseudomorphic," and "metamorphic" action, in the "bosom of the ocean"; by convulsions of the earth combined with "heat" and "pressure," changing soft deposits into shales and slates; by igneous action; and finally by "streams and river courses."

In continuation, the paper proceeded to show, after stating that the earth has its chemical history, that "iron serves to illustrate its grand epochs."

Pointing out the two methods of proceeding in geology, namely, beginning with "primitive" formations, and proceeding forwards and upwards to those of the present day; or commencing with the recent to travel backwards until "we reach the confines of our actual knowledge, and the misty realms of theory and conjecture," he selects the latter.

He then traces iron through the forms of bog ore, confined to the "post Adamic history of the earth"; brown hæmatite which marks the "drift epoch and deposits;" the carbonates of iron, in their varieties of

1. The "black band;"
2. The kidney ore, or argillao-carbonate of iron;
3. The silico-carbonate, or flint ore of Pennsylvania;
4. The limestone ore;
5. The septaria, a carbonate with alumina;
6. A bed of black band, about 40 feet above the lower bed of coal;
7. Another bed of the same immediately beneath, and
8. Another bed of carbonate, 40 feet beneath the coal;

marking the "second great chemical epoch."

Passing by the "Devonian," he next proceeds to speak of the lenticular, or oolitic ore of Madison county, N. Y., as marking the "Silurian" epoch of geologists.

He finally passes to the primitive epoch, marked by the "magnetic, the specular, and peroxide" of iron. In speaking of them he "rejects the Plutonic theory of their formation," and "accepts heat, only as a modifying agency."

From this discussion he draws the "practical lesson" that each geological epoch has, as well as "its remains of organic life, certain mineralogical features by which it may be identified."

Mr. Wiard, the inventor of the steam ice-boat, was next called out, and gave an interesting account of the origin and history of his improvements.

Mr. Shultz exhibited a model of his new cut-off for steam engines, which has been in operation at the Palace Garden. Its novelties are, the use of only one sliding valve, which is balanced. It is moved by the action of the governor, through the medium of revolving cams, so as to cut off the steam at any point, during the whole stroke. The point of cutting off is constantly shown by a pointer, moving in a right line over a graduated scale. It has, also, a lever, by which the engineer can reverse the motion with great facility.. This invention seemed to meet with very general approval.

Mr. Westbrook then explained the construction of his churn, to which he has given the name of "Butter Mill." It is intended to separate the butter particles from new, sweet milk, and is claimed to be an improvement on Johnson's churn, which was exhibited before the Polytechnic last year.

Mr. Hoagland exhibited some of the material from which he makes his earth paint, having impressions of the vegetable remains supposed to have modified the action of the iron, and produced a peculiar mixture with clay which has no perceptible grit.

Mr. Seeley having been down to the bottom of the East River, on Wednesday, in "Ryerson's diving bell," was called upon and gave a very interesting account of his descent, and of the peculiarities of the apparatus. The main feature of difference between it and the famous "Nautilus" diving bell, also of American origin, is in the manner of providing fresh air for breathing purposes. Mr. Ryerson does not take air from the atmosphere, but by means of a spray pump, throws into the bell water which always contains a small quantity of air, having more oxygen in it than is found in common air. The main effect of the pump is evidently to absorb the carbonic acid thrown off from the lungs. The machine is said to have been in successful operation during the past summer.

After further discussion on diving bells, the Association decided to continue the subject of "Novelties at the Fair," and adjourned to Thursday evening, Nov. 3d.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE, *November 3d*, 1859.

S. D. Tillman, Esq., in the chair. Mr. Haskell, Secretary, pro tem.

After reading the minutes of the last meeting, Mr. Arnold's Lamp Stove was exhibited, and its uses were explained by Mr. Stewart. It can be employed as a feet warmer and general heater in a small way, and is comparatively inexpensive.

Mr. Garbanati introduced the subject of the employment of steam, or rather its economizing, by the use of condensers, and wished to know if any of the judges who examined Prosser's Steam Condenser were present, and would explain its construction and probable efficiency.

Mr. Garvey, one of the judges, objected to the introduction of any man's invention, and discussing it, without first informing the inventor that such a discussion was intended; and also stated that it was suggested to the Board of Managers to have a detailed report made by the judges for publication. It was then proposed that the subject of steam-boilers be taken up for discussion at the next meeting.

Mr. Koch explained his "Moving Tread Power," for mowing and reaping by man power. It consists of devices for employing the force of a man, walking upon belts, or having straps to his feet—the belts or straps working over pulleys which, by ratchet and pall, are prevented from moving in one direction without turning the axis, and are moved in the other direction by a recoil spring. Mr. Koch stated that he had a machine constructed, weighing only 60 lbs., which would enable a man to do a much larger amount of mowing or reaping than he could do by means of a scythe, &c.

Mr. Butler called attention to the beautiful specimens of seamless pure copper tubes exhibited at the Fair. Several members spoke in high terms of them, and Mr. Johnson described the mode of their manufacture, viz: The molten copper is poured into a suitable vessel, so mounted that a high speed of rotation can be given to it, and the copper it contains; the effect being that the copper is piled up, by centrifugal force, against the sides of the vessel, leaving a hole in the centre, and expelling all the air. The mass is then cold drawn, on a mandril, to the proper thickness; and is rendered compact, uniform, and pure, by the whole process.

The manufacture of shafting, by combined rolling and drawing, was then discussed, as some specimens which had been exhibited had attracted considerable attention. There being, however, a difference of one cent a pound between them and turned shaftings, the club seemed to think that, though excellent, they would not be generally adopted.

Zinc tubing was spoken of in terms of approval, by several practical plumbers, builders, &c., and the comparative healthfulness of zinc and lead being called in question, gave rise to some interesting remarks from Charles Seeley, Esq., chemist, and Dr. Deck, who had been engaged in England in examining the water which had paralyzed Her Majesty's hounds. The conclusion come to was, that either very pure or very impure water will affect lead pipe, but that, in general, it may be used without danger.

Mr. Fisher was requested to read a paper on steam boilers at next meeting, after which the Association adjourned.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE,
November 10, 1859.

S. D. Tillman, Esq., in the chair. John Johnson, Esq., Secretary, pro tem.

Miscellaneous business was taken up, and Mr. Seely explained Maillefert's diving-bell. It is used for gathering oysters, but does not seem equal to Ryerson's for general purposes. The novelty consists in having an air chamber, with trap-doors, so that a man or a barrel of oysters may be passed into the air chamber from below, the lower trap-door closed, and the man or barrel passed to the surface through the upper trap-door, which is intended to be always above water.

Mr. Fisher being called upon, read his paper upon steam boilers.

MR. FISHER ON STEAM BOILERS.

In this paper I purpose to treat of locomotive boilers, and those which are used for steam carriages, fire-engines, and other purposes which require lightness.

The locomotives built before the multitubular boiler was invented, vaporized more water per foot of surface than those of the present time. The Killingsworth engines vaporized $24\frac{3}{8}$ lbs. of water per foot of surface; but the best modern boilers vaporize but 15 lbs.; and ordinary boilers not more than 10 lbs. This difference is due to the greater proportion of fire-surface, and the smaller proportion of flue-surface in the early boilers; and not to any great superiority, even on the score of lightness. The extended flue-surface of modern boilers is lighter than an equal extent of surface in the old boilers; and it has the advantage of saving fuel. The old boilers vaporized five or six pounds of water per pound of fuel; the modern boilers vaporize nine or ten pounds.

Recent practice has illustrated the merits of the two systems—that in which fire-surface superabounds, and that in which flue-surface superabounds; and it appears that a medium proportion, in which there is more surface exposed to the radiant heat of the fire, and less to the contact of smoke, gives a more economical result. There have been cases in which flues have been reduced from eleven feet to four feet in length, the vacated space being converted into a combustion chamber, and yet the generation of steam and the economy of fuel are increased; and, in one of the South-Western railway engines, the flues were reduced to twenty-two inches in length, and with a good result.

In the old engines, the grates were larger than in the new, in proportion to the total surface; but not, therefore, larger in proportion to the vaporizing power. In recent coal-burning engines, the grates are larger, approaching the early proportion, say one of grate to forty of surface; one to eighty-five being common in the multitubular systems, and one to 125 being sometimes adopted.

The steam room is an important element in a boiler. If it is deficient or ill disposed, the boiler will prime; and, intimately connected with this, the area of water-level, which allows the steam to separate from the water, is also important. One square foot of water area to thirty-five of heating surface, is not uncommon; but one to twenty-five is observed to work better; and one cubic foot of steam room to thirty square feet of surface is frequent in practice. These proportions are for about 100 lbs. pressure—if the pressure is much less, priming ensues; if much greater the steam room may be diminished. It seems that a certain *volume* of steam may be delivered from a certain extent of water area and steam room; and it makes little difference whether the steam be more or less dense within the limits found in practice. Hence an increase of pressure will allow a reduction of steam room and water-level.

Thus we see considerable changes in the proportions of boilers. The standard boiler, that succeeded the early boilers, has a small grate, and little fire-box surface, and much flue-surface. The recent boilers, more like the early ones, have a large grate, large fire-box surface, and moderate flue-surface. It must be observed that a high pressure is used in the new boilers—double that of the early ones; the effect of which is to keep the steam comparatively dry.

Dryness of steam is acknowledged to be highly important; and, within a few years, in locomotives and marine engines, means have been applied to dry it, or superheat it. Penn & Sons, of Greenwich, claim that they have saved thirty per cent. of the fuel by it; and the Allaire works claim that twenty per cent. is saved by their steam chimneys. Sharp, Stewart & Co., of Manchester, have used the steam chimney, and McConnell has used a water-heater, both with a saving of fuel.

Let us now consider the upright multiflue boiler, in reference to these changes. It has a large grate—much larger than the standard locomotive boiler, but not larger than the recent examples. It has a large flue area, to pass the smoke, which is advantageous; and its flues pass through the steam room, and serve to dry steam, which is claimed to be advantageous; and a large fire-box is got, without much inconvenience, simply by making it as deep as is required. The fire-box in this boiler has usually been made shallow, so that there has not been sufficient room for combustion, and the fire has been too near the tube-joints, and burned them, especially when the crownsheet becomes foul; but a depth of thirty to thirty-six inches, instead of twelve to eighteen, will make a proportion more like that of the recent locomotive boilers, and will place the crownsheet farther from the fire, and a greater depth may be adopted if expedient.

It has been objected that the flues passing through the steam room, will be burned at the upper ends. I have inquired as to the fact, and have not found direct evidence of it; on the contrary, Mr. Secor states that the steam chimney lasts as long as the fire-boxes. And Mr. Smith, of the New Jersey Locomotive Works, says that they repaired an old locomotive boiler, whose flues had become imbedded in a solid crust, so that no water could reach them, and yet they were in tolerable condition. From all that I can learn, this objection is not sustained by facts. The only fact unfavorable to this boiler, which I have found is, that the incrustation upon the crown-sheet, when the water is foul, soon causes it to burn out. It is, therefore, necessary to keep it clean.

The height of this boiler has sometimes been too great for locomotive purposes—eight feet is not unfrequent. Six feet is as high as is allowable for carriages, and five and a half is better. In recent examples, the tubes have been made two feet long, and in some cases fifteen inches. The steam fire-engine boilers, built in Lawrence and Manchester, have 199 tubes, two feet long and one and a half inches diameter, set five-sixteenths apart. The waist is so constructed as to cover within one-fourth inch of the tubes. These boilers are said to work well; but I doubt whether they work so well as boilers with more room for the circulation of water.

There have been upright tubular boilers in which the flues did not pass through the steam room, but were covered with water; and a smoke-box, somewhat like the fire-box, occupied the middle of the steam space. This arrangement is to prevent the burning of the tubes; but it substitutes the burning of the smoke-box, which is dangerous—if there is burning at all—and it diminishes the steam room and water-level, and makes the boiler complex and expensive, and difficult to repair. And all this trouble is incurred for the sake of avoiding an evil which, so far as I can learn, does not exist in fact. If any one present can testify as to its existence, I hope he will do so; but I hope no one will tell us what he imagines, or has got from the imaginations of others.

On the whole, I consider the simplest form of the upright tubular boiler as the best. It is the cheapest, has the fewest joints, is easiest to repair, dries the steam, and is durable if kept clean.

There is another type of boiler in which the water is inside the tubes, for marine use, when the boiler is so large that men can go inside to clean and repair the tubes, it does well; but for small boilers, in which the joints are not accessible without taking off top or bottom plates, it is not good in any case; and it is never good unless the smoke-current is at right angles with the tubes. If it be parallel with the tubes, the heat is not communicated so well as when it passes through small flues. In Montgomery's boiler, the smoke passes swiftly across the upper ends of the tubes, and then decends, and returns under a diaphragm. In Morton's boiler, the tubes are shorter than in Montgomery's, and there is no return of the smoke. Both agree in giving a rapid movement to the smoke, which insures its impinging against the tubes, so that each particle shall have a chance to come into contact. But when smoke goes through straight and smooth passages that are large, the middle of the current does not impart its heat.

There is a composite boiler, made up of water-tubes with flues through them. The first of this kind was patented by Ogle & Summers, in 1830 or '31. It had chambers at top and bottom, so that the water circulated, descending through an outside pipe, and ascending in the annular spaces between the water-tubes and their internal flues. The smoke ascended partly through the flues, and partly between the tubes. This boiler vaporized 4 1-5 lbs. of water per foot of surface—one sixth as much as the old locomotives; and it required to be worked under a pressure of 247 lbs. to give it its best effect. The water-tubes were 4 inches, and the flues 1¾ inches, leaving about 1⅛ water-spaces. The fan-blast was used, being found more effective than the steam-jet; and the consumption of fuel was about 1 lb. for 5½ lbs. of water.

Messrs. Lee & Larned use the annular arrangement in their steam fire engines; but they have a steam drum much larger than the chambers of

Ogle & Summers. Their water-spaces are less, the water-tubes being 2¼ and the flues 1½, and sometimes 1¾ inches, leaving but 5-16ths water-spaces. There is very little water in the boiler, consequently the steam can be raised in about nine minutes, and when the fire flashes up, steam is made rapidly; but when the fire deadens, the steam falls rapidly. I have not seen these boilers do what is reported to be their best work; the best I have seen is about equal to that of Ogle & Summers' boiler.

The boiler of the Storm fire-engine has 380 feet of surface; that of the Cary has 480. The Storm makes steam nearly as fast as the Cary. This I attribute to the fact that the smoke crosses and recrosses the water-tubes, and descends to the bottom, and thence ascends through the flues, giving length of run and the advantage of the cross movement. The moving row shown, gives an idea of the movement of the smoke. This design is mine, except the old annular arrangement and the necks of the external row of tubes, which are claimed in Mr. Larned's patent. I have another design in which I dispense with the necks of the tubes, and turn the smoke outside, instead of inside, the bottom chamber. This arrangement places the grate lower, and gives more room for combustion and more fire-box surface, and a longer travel for the smoke. I exhibit this plan merely for the sake of asserting my claim to it, so that if it should prove to be valuable, I may have the benefit of whatever there is new in it. I consider that if made with water-spaces, sufficiently wide, it will work tolerably well; and in cases where the cost of construction and repairs is a secondary consideration, it may be of use.

There is another kind of tubular boiler, which is worthy of mention, on account of its safety—I mean that of Francis Macerone, which he used on his steam carriage. It might be called a group of boilers, each being connected with a water channel at bottom, and a steam drum at top; the connections being as small as is permissible, so that if one bursts, the steam from the others cannot rush out fast enough to do much harm. This boiler was made up of eighty-one tubes, four inches diameter, and thirty-six inches high, except the outer rows, which were forty-eight inches high, and formed the walls of the fire-box; the smoke ascended between them. It performed about as efficiently as Ogle & Summers' The tubes were about two-thirds filled with water. It is worthy of consideration whether these tubes may not be so arranged that the smoke will more effectually give its heat to them; and so that each tube may easily be disconnected from the group in case of leakage. When steam is worked at a pressure of 500 lbs. per inch, as I believe it will be, such a boiler may be the best. And it does not appear that it need be very costly, either in construction or repairs.

A good boiler for locomotive purposes is much wanted. It is now evident that steam can be applied to agriculture, common road locomotion, fire-engines, and other uses, that require portability. But, if a boiler is costly, it will not pay; if it is heavy, it will not pay; if it consumes too much fuel, it will not pay, We want a boiler that will vaporize not less than 15 lbs. per foot of surface, and not less than 8 lbs. per lb. of fuel; that costs not more than $1,50 per foot of surface; and is accessible for repairs; and has few and simple joints. If it is light, so much the better; but a heavy boiler tells in the fuel bills, and the bills for repairs of wheels and roads, and is really of less expense than a complex and fragile boiler, that costs more at first, and requires frequent repairs. Whoever can produce a new boiler, that in the highest degree combines these qualities, will make a fortune by it if he manages it well.

There may be considerable improvement in the present boilers; they may be made of steel, and much lightened; the fire-boxes may be welded; and, perhaps, the outer shells may be welded; which would make them 40 per cent. stronger, and more free from leakage. For very small upright boilers, it is desirable that the fire-box should be free from the incumbrance of riveted joints; and if the weld is so good as not to leak, it will be strong enough, supposing the fire-box to be stayed to the outer shell, as it always should be.

I will close this paper by expressing my conviction that high-pressure boilers ought to be used in ships, in combination with both high and low-pressure engines—the steam working first in the high pressure engine, and being exhausted into an intermediate chamber; from which, it should go to the low-pressure engine. This would involve the necessity of fresh water for the boilers; but I believe this can now be supplied.

After the reading of Mr. Fisher's paper, Mr. Tillman remarked, that to produce perfect combustion, two-thirds of the air which supports the combustion should be admitted below the fire grate, and one-third above; and that engines so constructed are now in use on the Hudson River railroad.

Mr. Garvey considered that the employment of spirals in the tubes, by European engineers, was only effective in delaying the warm gases, so that they should part with a greater share of their heat, and consume more perfectly; and that, if the fact stated by Mr. Fisher were exactly correct, the advantage of employing a quick current of smoke must be due to the development of electricity, as friction always produces some.

Mr. Dibbin, in commenting on the production of steam, said that vaporization is due to the heat from the fire; and when steam, in the open air, is produced rapidly, the lower stratum of water is at a less temperature than 212° when steam is being given off, and the upper stratum of water, or, at least, the steam, is fully 212°, or more; also, in the upright tubular boilers, there is steam in contact with the tubes, not water, and to this the advantage of such boilers is due, for the steam becomes super-heated whilst it is being generated. There is an interesting fact which he would like to hear practical remarks upon, namely, "a marine boiler, above the water surface, wears out in one-third the time that a fresh water boiler will last."

Prof. Hedrick thought it could not be a fact.

Mr. Dibbin had seen a boiler so damaged in patches as to become useless, though to all appearance it was sound.

Prof. Hedrick said, perhaps chlorine may be generated, or hydrochloric acid; yet he did not think so; some higher acid may do this work.

Mr. Tillman suggested that thermo-electric action may have something to do with it.

Mr. Garvey submitted that it was useless to speculate or form theories about this action upon marine boilers until the facts were ascertained, by actual examination of a number of boilers, and the collection of well-authenticated facts connected with boilers, their use, economy, &c.

In view of the importance of the subject, a committee was appointed to obtain information upon it, and report at some future time. Prof. Garvey, Mr. Dibbin, Mr. Fisher, Prof. Hedrick, and Mr. Seeley, were so appointed.

Mr. Fisher asked if the phenomenon was of frequent occurrence, and what was the peculiar nature of the iron in which it was observed—did it contain sulphur, and was the action due to galvanic action?

Mr. Dibbin explained that, though boiler iron has failed in many instances, interested parties avoided having their boilers examined, and consequently the amount of information on the subject was very limited. He considered the generation of a large quantity of steam, some of which became decomposed during its production, was a probable cause of the chemical action upon the iron, some active element being liberated from the water.

Mr. Seeley said that Dr. Deck, in examining air from Ryerson's diving-bell, had found chlorine, though he could not see where it came from. Pure iron in pure water will not rust; it is the portion above the water that oxydizes, through the galvanic action of the circuit made up of the air, metal, and water. In like manner, if iron be impure—contain some other substance beside iron in combination with it—the oxydation is more rapid. Electricity has nothing to do with the mechanical effects of steam; and it is absurd to talk of water being decomposed into a mechanical mixture of oxygen and hydrogen, for they would unite and form water at the same temperature that water could be decomposed at.

Mr. Haskell.—There is a great difference between the salt in this country and in England; iron is used there for salt-evaporating pans, it cannot be so used here; both sides of the ocean do not seem to be well mixed up.

Mr. Seeley.—There is no doubt that water is decomposed when in contact with red hot iron—the oxygen combining with the iron, and the hydrogen being liberated; but hydrogen of itself can no more explode than carbonic acid.

President Renwick was glad that the vulgar errors which had been mentioned were confuted; for it was unscientific and absurd to talk of water being converted into explosive gases in a steam-boiler. It is well known to inspectors of steam boats, that steam chimnies are very perishable. This arises from the action of the heated iron on the steam, by which the former is rapidly oxydated. But the hydrogen, which is thus liberated, is no longer mixed with oxygen, and therefore cannot explode.

Mr. Dibbin.—In the case I mentioned, the resultant gases are intimately mixed, and they have strong affinity for each other, which causes them, as soon as the heat is lowered, to unite again into water or steam.

Mr. Garvey said, that the air in water contains more oxygen than ordinary air, and there is no proof that that oxygen is taken up by the red hot iron in addition to oxygen from water. May not the oxygen mix with the hydrogen from the decomposed water, and so give an explosive mixture?

Prof. Renwick.—The fact is well known that red-hot iron will decompose water. The experiment illustrating this, is performed every season in all courses of chemistry. And, if a proof be required to show that water can be decomposed by heat into a mechanical mixture of oxygen and hydrogen, it must be given by the advocates of that theory. We can give a strong fact to show that such a change is highly improbable, or, in fact, impossible. Perkins heated a vessel of water until it was incandescent, and would not escape through an opening made in the side of the vessel, and yet it remained water; the vessel was full, and when cold, the water was still undecomposed.

On a former occasion, I heard a full and satisfactory account of the causes of boiler explosions, I think, from Prof. Garvey.

Mr. Dibbin, in illustration of his remark, that the lower stratum of water is colder than the upper, mentioned the fact, that a tea-kettle, when boiling, may be removed from the fire, and the hand placed upon the bottom without fear of burning. After several remarks upon this phenomenon, it was proposed to try the experiment next night.

Mr. Hedrick then introduced a point with reference to the use of super heated steam, which gave rise to several suggestions.

The subject for the next meeting was then agreed upon, viz: Paints used to preserve Roofing; Mr. Seeley to read a paper.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE,
November 17, 1859.

S. D. Tillman, Esq., in the chair. John Johnson, Esq., Secretary, pro tem.

After the reading of the minutes of last meeting, Mr. Johnson exhibited some water in the spheroidal state. The experiment was as follows: Having heated a copper dish to a high temperature, he introduced a large globule of water, which, instead of flowing over the bottom of the dish and wetting it, remained suspended in its own vapor at a short distance above the dish, and jumped about, assuming different forms and evaporating comparatively slowly. Mr. Johnson stated that water exhibits an attraction for almost all substances, at low temperatures, and consequently wets them; but that, at high temperatures, it will not wet them, but assumes what has been called the spheroidal state, from the resemblance of the water globule to a sphere. The phenomenon is familiar to all persons who have noticed water falling upon a hot stove, or saliva thrown upon a flat iron to test its temperature. Leidenfurt, in 1756, investigated the phenomena presented by water in the spheroidal state; and more recently M. Boutingny obtained some striking experimental illustrations. (Annales de Chemie, 3 series, tome i., p. 356, et t. xi., p. 16). He has observed that water may pass into the spheroidal ebullition at any temperature above 340°, and remain in that state until the temperature falls to 288°, when it wets the surface and evaporates rapidly. Alcohol for this condition requires 273°, ether 142°. A thermometer in water in the spheroidal state indicates, 205·7°; in absolute alcohol, 167·9°; ether, 93·6°; hydrochloric ether, 50·9°; sulphurous acid, 13·1°, which are all several degrees below the ordinary temperature of ebullition of these liquids. Air is 815 times lighter than water, and the range of the barometric pressure is equal to one-tenth of the whole pressure, and affects the boiling point of water to the extent of four and a half degrees; for instance: when the barometer indicates 27·74 inches, water boils at 208°; 28·84 inches, water boils at 210°; 29·92 inches, water boils at 212°; 30·60 inches, water boils at 213°—and on top of Mount Blanc, Saussure observed that water boiled at 184°. It has further been observed that an elevation of 500 feet makes one degree difference in the boiling point of water, and that liquids in general boil in vacuo at from 67° to 145° less than under the ordinary pressure of the air. The vessel, however in which the water is boiled influences the boiling point to a considerable extent. Water in a glass flask, having a thin film of shellac coating it, will not boil under 221°; and the action is impulsive, alternately rising and falling, as the thermometer indicates a rise or fall in the temperature.

Prof. Hedrick was unable to see how barometric pressure could affect the temperature at which water took up the spheroidal state, The water simply evaporated as at ordinary temperatures, and the vapor given off at low temperatures is identical with steam. It requires no removal of pressure to generate it, as is seen by its filling a vacuum with steam at ordinary temperatures. The action was between the hot air currents around the water, and the vapor of the water, the hot dry air acting as a sponge to absorb the vapor.

Mr. Seeley considered that the barometric pressure, by reducing the thickness of the film of steam, under the globule, of water, brought the water nearer to the heated metal, and thus allowed it to become warmer.

Mr. Garvey stated that the elastic force of steam is always equal to the pressure under which it is produced; and, as it is also proportional to the temperature of the water from which it is formed, it is obvious that to generate a film of steam under a great pressure, requires more heat than to generate it under a low pressure.

Mr. Seeley considered this explanation as quite correct.

Mr. Fisher said that many engineers attribute boiler explosions, in several cases, to the change of water suddenly from the spheroidal state into steam, and instanced the boiler of the Great Britain as a case of defective construction, in which the water spaces were so small that the water was generally in a spheroidal state instead of being in contact with the tubes, of which there are a great many employed, and the water spaces are consequently only three-eighths of an inch. But, in the case of water in the atmosphere, he could not see exactly how the changes of barometric pressure could affect the heat at which that state was assumed, since the pressure acted equally in all directions, and would, consequently, press the water from contact with the capsule as well as to contact; so that it really did not affect the position of the globule.

Mr. Garvey stated that the idea of barometric pressure affecting the temperature did not rest upon the supposition that the water was brought nearer to the heated surface by its action, but that liquids assume the form of vapor when charged with sufficient heat to give them the elastic force necessary to overcome the pressure under which they happen to be. Water, for instance, boils at various temperatures, according to the pressure under which it is; and it is well known that, in high mountain regions, meat cannot be cooked by boiling, for the water will not be hot enough; it will go into steam at a much lower temperature than at the level of the sea, owing to less barometric pressure. If Prof. Lowe undertakes to cook meat in an open vessel, by boiling, he will have to eat it parboiled, as he cannot, in his transatlantic trip, get heat enough into water to completely cook his food, by boiling, in the upper regions of the atmosphere.

After some further discussion of the nature of the phenomenon presented by Mr. Johnson's experiment, the regular subject of the evening was called up, and the following paper was read, on

PAINT AS A PROTECTOR.

By Charles A. Seeley, Esq., Chemist.—Paint, in the view of utility, is employed as a protective covering to a body, against the injurious influences of the air, water and other destructive agencies. Wood and the common metals are especially attacked by oxygen; exposed to the air, they are consumed as in a fire. Paint is the fortress which keeps out the destroyer. The utility of paint is so apparent, that any study of its composition and properties, which will tend to improve it in any degree, is of great importance.

Paint is understood to be a mixture of a liquid and a solid, in powder. The desirable physical conditions of these are: that the liquid should have a certain amount of viscidity, in order to maintain the powder in suspension, and that the powder should be as fine as possible, and nearly of the same specific gravity of the liquid. But the chemical properties are of still greater importance. The liquid and solid must be such as will not injuriously react on each other, and such as are not destroyed by contact with air and water. The liquid should be one which by oxydation or otherwise becomes a tough and somewhat elastic hard substance. Also, there should exist between the liquid and solid a certain degree and kind of affinity which may favor the homogeneity of the mass. The main virtue of paint resides in the liquid; the solid serves unfavorably to dilute that virtue, and favorably by securing that kind of consistency which permits easy manipulation with the brush, and favorably, also, by preventing the absorption of the liquid when the paint is spread on porous surfaces.

Unfortunately no substances are known which completely fulfil all these conditions I have named; we cannot procure in nature, or by art, that happy combination of properties which should exist together in the model paint. We would like a paint which would dry to the hardness of flint, the toughness and elasticity of India-rubber, the indestructibility of carbon. But we can have no such paint, and we are obliged to limit our inquiries to the choice among the imperfect materials we have.

In the choice of the liquid of paint, we can have but little doubt. Theory and the almost united voice of practical painters, after centuries of experience, have decided that, in view of its inherent properties and its cost, nothing at present known can take the place of linseed oil. There may be special uses of paint, where some other vehicle may be substituted to advantage, yet to believe it I require other evidence than has been given. We cannot reasonably look beyond the class of substances known as drying oils, for a substitute; and up to the present time, none of these has been seriously proposed for general use. Volatile oils and such as rosin oils, which oxydize into brittle resins, are altogether out of the question. Their cheapness is only a cheat. Nor will any solution or mixture of india-rubber or gutta percha, take the place of linseed oil, by reason of expense as well as their inferior properties. Let it, then, be distinctly understood, that linseed oil shall be the liquid of paint.

As a theoretical question, the choice of the solid body in paint is a difficult one; it involves some of the nicest refinements of chemistry; but, as a practical question, the inherent differences of the multitude of admissible substances are slight enough to bring it to the narrow limit of a consideration of cost. That substance which is permanent under ordinary influences, and which can be powdered and ground with oil, at the lowest cost, will be preferred. Do not the ochres answer to this condition? I suggest here, also, that metallic oxydes and carbonates generally have a certain affinity for oil, which renders the mixture more easy and intimate, so that the resulting dried paint is more compact and less disturbed by friction. The peculiar property of white lead, in mixing with oil, and such paint drying up to become a remarkably hard and tough body, is well understood, and indicates it—notwithstanding its greater cost over ochres and other cheap substances—as the best material for inside work which is to be exposed to much friction. Lead paint, however, is not suitable for surfaces much exposed to the weather. So that it may be that many or all solids which are used in paint exert a peculiar chemical action; yet I believe, except in the case of lead paints and a few others, it is of little or no practical account. The ochres I should recommend for outside work. The substances called "mineral paint" are, no doubt, good enough; but I have failed to see any advantages in them over materials much cheaper. The pretensions made for them are quackery.

Thus I arrive at the conclusion, that linseed oil and ochre make a paint which may be ranked as first among paints in the order of usefulness.

Substances are often added to paint for special purposes. Oil of turpentine is added to dilute it. Painters are not commonly aware that turpentine impairs the solidity and toughness of paint. Turpentine contains rosin in solution, which is left in the paint on drying; moreover, by exposure to air in drying, the oil of turpentine, by oxydation, is, to a considerable extent, converted into rosin. Camphene only should be used for thinning paint. If benzole were cheap enough, it would be preferred to either. Substances are also added to make paint dry more rapidly; these invariably weaken the paint, and should only be used when plainly required, and in the smallest quantity. It is a law, I believe, well established, that the longer time taken in drying, the more durable will be the paint. Wherever pure raw oil can be used, it may be preferred to boiled oil.

As a roof protector, I have little doubt that sheet tin, well painted with good linseed oil paint, is more effective, and cheaper in the end, than anything else. Tar compositions of all kinds I rank below "mineral paints."

I have considered paint only in view of its usefulness as a protective; and I have so defined the subject that it did not seem worth while, at present, to discuss the uses of soluble glass or chloride of zinc.

Mr. Veeder mentioned some experiments which he had tried on whale oil, as a menstruum for colors. He considered linseed oil as the best menstruum for general use, but thought that whale or fish oils may be used in many cases, with decided advantage, particularly where the paint was not required to dry speedily.

Mr. Butler considered it a great evil that paints, when sold prepared, are not of uniform quality. One lot will not dry, or will spread thick or thin; the next coat will be of widely different character, and, therefore, the two or three coats will be separated, and will not form a uniform covering for wood, iron, or other material. It is well known that fish-oil is used to a great extent in making putty; but it does not dry, and, therefore, in painting over a puttied hole, there is a spot left in the work different from the general surface.

Mr. Veeder explained that, in course of time, whale-oil parts with a portion of its hydrogen, and becomes more viscid, thereby becoming a better cement for the colors.

Mr. Seeley considered linseed oil as the only true oil for general painting purposes. That whale oil is a fat oil, and not at all suited for use where the paint is expected to dry and to bear friction; and that the idea of such oil parting with its hydrogen, seemed an unscientific mode of accounting for its viscidity; and there was really no chemical action which was analogous to that alluded to by the gentleman.

Mr. Veeder gave as his authority the decision of a society in England, who had examined the subject, and so accounted for the fact, that whale-oil, exposed to the air, does become viscid, a fact which he himself had observed frequently; but it requires three or four months for such oil, when used with paint, to dry.

Mr. Seeley showed that if the hydrogen left, the oil must weigh less; but the fact was, that oils in drying do not, like water, evaporate; linseed-oil oxydizes, and, consequently, takes more matter into its substance, and, therefore, the skins of paint are more dense than the paint before drying or oxydizing. The use of an alkali to cut up the skins of paint having been alluded to, I would suggest that such a practice as making the oil of paint into a soap, with alkali, is an absurd practice. The oil is not soluble in water; but the soap is, and therefore, the paint will wash off if prepared in such a manner.

Several observations made, while using different kinds of paint, were given by gentlemen in the meeting, upon the advantage of suitable weather for outside work; the temperature of the paint, and of roofs, when it is applied, &c., and upon materials used in roofing.

The subject for next evening was selected—Mr. Howe to read a paper on Musical Instruments, particularly the flute. A gentleman, who has invented an improved one, is expected to give an exhibition of its power and compass on next evening.

The Association then adjourned.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE, *November* 23*d*, 1859.

Mr. Stewart in the chair. John Johnson, Esq., Secretary, pro tem.

[The following communications were handed in to the Polytechnic Club by Judge Meigs:]

THE AURORA BOREALIS OF AUGUST 28, 1859.

I observed it throughout, and was convinced that the upper coruscations were far above our atmosphere, to which the general theory is that it is confined. Light penetrates all space, and as the Aurora is formed of the same elements, there is no reason for its being confined to our fifty miles of atmospheric air.

From observations made as far south as Havana, I projected a quadrant from north pole to equator, from the angles of observations reported. I found the highest point of the aurora to be, by calculation, about four hundred miles.

The question was considered by others. The Franklin Institute Journal reports an opinion that the highest points of the radiation or streamers was 596½ miles, vertical to latitude 36 deg. 47 min. north.

I recorded my observations on the meteoric shower of 1833, when, for the first time, I noticed that the centre of radiation was from a point about 15 deg. southeast of our zenith—40 deg. 41 min.—This account of mine has been republished in England, word for word, without my name attached. I remarked the same peculiar fact at the aurora since that; it was on the 28th of August.

The auroras have been considered by several writers heretofore, as attaining heights far above our atmosphere.

Marian calculated one at 525 miles, Bergman one at 460 miles, and Euler at several thousand miles, &c. HENRY MEIGS.

September 16, 1859.

THE WORLD'S TELEGRAPH.

The Club (Polytechnic) proposed the route by Behring's Straits before the Atlantic cable was laid and lost. One member, Mr. Tillman, said, and so said others, that our knowledge of electricity did not warrant so long a line of induction, especially at ocean depth; that, even if successful, it would not accommodate the millions who want it as post; that Behring's Straits would accommodate thousands of wires, the depth being but 200 feet, and the length, in all, about 50 miles, divided by the islands Ratmanoff, Kruzenstein, and a Rode; that, as it was a common cause of nations, the Czar of Russia would do it, and all nations join in its maintenance. The plan is already laid for a line along the great river Amoor, over 2,000 miles, to Ochotsk, and thence to the East Cape. That is the only path, because the liability to get out of repair makes it indispensable to have it within easy reach. This plain road can be made and kept, and no necessity for burning the City Hall to illustrate it.

The above plan is published in the transactions of the American Institute about two years ago. H. MEIGS.

November 21, 1859.

[Ingenieur Vereines, Vienna, July, 1859.]

BRIDGES.

The last numbers of the transactions of the Union Engineers of Austria, contain among other valuable scientific matter, drawing and description of a new stone bridge over the rapid river Sann, formed of arches, based on the rock under it, and the whole bridge *built on an arc convex to the stream.*

The communication on the telegraph called forth some remarks from Mr. Seeley, in which he attributed the failure of the "cable" partly to the use of iron-wire around the copper core, the two metals and the gutta percha between forming a sort of Leyden jar arrangement, and partly to the employment of gutta percha, instead of india-rubber, as an insulator.

Mr. Garvey remarked upon the bridge alluded to, that the employment of an inverted arch, to prevent the sinking of buildings in soft ground was common—the arch distributing the load over a large surface, so that no part was under more pressure than it could well support; but he never before heard of a bridge being built with an inverted arch to prevent its being blown up by a flood. There could be no difficulty in constructing a bridge of one or several arches, formed in the usual manner, and a counter inverted arch spanning the whole length of the bridge, to keep the voussoirs of the arches in their proper place, and so prevent their being lifted by drift timber, &c., in case of a flood.

On the subject of the Aurora, Mr. Seeley said that elementary books say our atmosphere is 45 miles high, but electric light is said to be seen hundreds of miles high; and as it cannot be seen in a vacuum, there seems to be strong evidence of the existence of ether, or other matter, beyond our atmosphere.

Mr. Garvey.—The measurements given at different times of the altitude of the aurora are such rude approximations, and differ so widely, that it is little better than guess-work to undertake the measurement of such an altitude with the data which we can obtain. We assume, for instance, that the radiation of the auroral light is from a "pole" not an "axis," and that the light from the aurora follows the same laws as solar light, both assumptions, of which we have no proof.

Mr. Seeley considered that the last aurora was well calculated for measurement, and saw no difficulty in measuring the altitude of the auroral displays, since the light radiated from a well-defined point. The heights of clouds can readily be measured from the elements furnished by their shadows, in connection with the horizontal and vertical directions determined by plummet.*

The regular subject of the evening being called up, Mr. Howe read a masterly paper on

MUSICAL INSTRUMENTS.

He divided all instruments into two classes; first, those which produce musical tones by the vibration of a column of air; second, those which communicate sound to the surrounding atmosphere by their own vibrations. The organ was taken as the type of the first class, and the violin as that of the second.

In commenting on organs and other wind instruments, played by means of keys and stops, Mr. Howe paid a well-merited compliment to the improvers of the Melodeon (Carhart, Needham & Co.), who brought the delights of music within the power of possession of the many, and substituted an instrument capable of sustaining its tones for the tinkling of the cheaper kinds of pianos. Brass instruments and drums for martial music were passed in review; but, in consequence of their want of perfect intonation, and the crashing, braying noises which they produce, they were esteemed only fitted for the noise and tumult of war. The flute was then traced from its earliest history to the perfect Bœhm flute of the present day, the most finished form of which, as made and improved by Mr. Badger, was then exhibited, and its powers were tested by some performers present. Its compass was considerable, and the fullness of the deep tones was commented upon by several.

* It appears now probable that the aurora is an optical phenomenon, due indeed to electro-magnetism, and that, as in the instance of the rain-bow, no two persons see the same phenomenon. Hence all attempts to estimate its distance would, in this view of the subject, be futile.
J R.

Mr. Howe also treated of the harp and violin, and spoke of their excellence as consisting in the ease with which the performer produced any interval in true pitch, by lengthening or shortening the string, by sliding the finger up or down upon it. In this particular the piano is peculiarly deficient.

After Mr. Howe's paper, a neat little apparatus was shown, by Mr. Johnson, which produced a clear, ringing tone, by the impact of two columns of air, one upon the other. It originated from Mr. Stevens' gas burner giving a musical tone, when the outflow of gas is too strong for economical consumption,

Mr. S. D. Tillman remarked that the interesting paper of Mr. Howe related principally to the quality of musical notes, particularly those produced by the Bœhm flute. As the subject of musical instruments embraced all kinds, it necessarily included that of temperament, which has always been regarded as a mysterious subject.

The sensation of sound is caused by vibrations or pulsations of the air; when the pulsations occur at irregular intervals the sound is called "noise." When at regular intervals, "music," or "musical sound."

The "pitch" of a musical sound depends on the number of pulsations of the air which are produced in a given time; the "loudness," upon the mechanical force with which they are produced, and the "quality," upon the smoothness of the wave. The Bœhm flute gives tones remarkable for their smoothness; the clarionet those of the opposite character.

The string of the piano always gives the same tone, giving it loudest when first struck, then gradually dying off, the vibrations being isochronous, though of unequal amplitude. It being important to have a standard pitch, the French have lately adopted A, which conforms to 822 vibrations for the middle C, between the bass and treble clefs. 812 vibrations would be better, and the speaker was glad to find that Sir John Herschel had lately written an interesting letter, in which he advocates the latter. In selecting a standard, the barometer is supposed at 30 inches, and Fahrenheit's thermometer at 62 deg. The lowest C which can be heard has, according to this standard, 16 vibrations in one second of time, the first octave C above it has double the number of vibrations, 32; the next C above has 64; the next above, 128; the next, 256; and the next, or middle C, has 512. To get the octave of any sound made by a pipe or string, we reduce the pipe or string one half in length, which produces double the vibrations. The monochord is a single string on which the whole series of sounds can be obtained by measurements. If 1 represent the whole string, $\frac{1}{2}$ will represent its octave, $\frac{2}{3}$ will give the *fifth*, which is the next best chord to the octave. In this way we get a series of fractions which represent all the notes, but these sounds all belong to the original key. If the tonic or key-note is changed, the original true notes will be found untrue, because the ratio between the first and second notes is different from that between the second and third; one is a major tone and the other a minor tone, while the next note, called a diatonic semitone, is an interval exceeding one-half of even the major tone.

This unequal division of the scale compels us to vary the intervals from their true position whenever keyed instruments are used, having twelve semitones in the octave. To this class belong the piano, organ, flute, etc. On the violin and other stringed instruments, except the guitar, the player can slide the finger so as to produce the true note. So, on the trombone, the pipes, by sliding into each other, can be made to give the true sound. On these instruments C sharp and D flat are two distinct notes; but on the organ, piano, flute, and other keyed instruments, these two notes must be represented by the same sound. This is accomplished by what is called tempering; in which process the fifths are slightly diminished in pitch and the fourths slightly increased; by this means a system is introduced which nearly approximates to the true intervals in the keys of one, two, and three sharps, or the same number of flats; but is less correct as the number of flats or sharps is increased. Another system of temperament is the *isotonic*, in which the semi-tone intervals are equi-distant. Of course, in this arrangement one key is no better than another, and all are too far from the true diatonic scale to be agreeable. The ear leads the voice to sing correctly in every key; and to make the best harmony, nothing but stringed instruments and sliding trumpets should be used.

It is the height of the vocal art to sing correctly, and yet to temper the voice to tempered instruments whenever occasion requires. The voice should first be trained to true intonation because the ear, accustomed to true measurements, can easily guide the voice through the mazes of tempered harmony. It is of the highest importance to have a clear view of the science of acoustics before attempting the art of musical vocalization or instrumentation. For the guide of vocalists and instrumental performers, the speaker has invented an instrument which he calls the TONOMETER; its object being to measure to *the eye* all possible intervals, in the major and minor modes, and is adapted both to the tempered and true systems, so that more than fifty different tonics may be assumed in a single octave. By this instrument, thorough bass, an almost incomprehensible study to ordinary musicians, becomes easy of acquisition. He would take an early opportunity of presenting it to the Association for their inspection.

The Association adjourned, having selected two subjects, viz: "Life Boats," a paper by Mr. Garbanati; "Aerial Navigation," by Mr. Stewart.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE, *November* 30, 1859.

Mr. Fisher, Chairman, pro tem. Mr. Garvey, Secretary, pro tem.

The regular subjects of the evening.

"LIFE BOATS" AND "AERIAL NAVIGATION."

Mr. Garbanati introduced his paper by remarking that he had read through the proceedings of the Institute for three or four years, and never once found anything discussed in connection with the sea or navigation.

Having passed some severe strictures upon the gross carelessness shown by ship-owners in not providing suitable boats, in sufficient number, and properly found and provisioned, to meet the exigencies of wreck, leak or fire at sea, Mr. Garbanati proceeded.

MR. GARBANATI'S PAPER ON LIFE BOATS.

"I am aware that many vessels carry life boats, but still insist that very few carry enough for the accommodation of all the passengers, because they are not easily stowed; and fewer vessels still have their boats prepared and provisioned in advance. I cannot call to mind a single instance of such forethought. When an accident occurs, all is hurry and confusion, and then no boat can be equipped and provisioned in a proper manner. Nor will life boats be so prepared effectually until they be turned to useful purposes in the economy of the vessel.

"A plan for so doing suggests itself, which I wish to submit to the consideration of the Polytechnic club; and which, though possibly not available for sailing vessels, is, nevertheless, suited to steamers—and these are now becoming the ocean carriers of human freight. Almost all vessels have a deck cabin, known by various names according to its construction and uses, and all vessels can readily be supplied with such, if not already provided. This cabin can be so constructed as to serve as a boat or raft. It can, with ease, be fastened to the vessel when used as a cabin, and yet so fastened that it can be detached in a few minutes, and converted into a boat. Such a cabin may be made in two parts—the lower part forming a boat five feet in depth from keel to gunwale; the upper one, a raft about three feet deep; the two, when placed together, forming a cabin about seven feet deep. They could be so put together as to be air and water tight, by making the under lip of the joint half round, and the upper lip, a semicircular groove, the parts being held together by chain plates, like those of the rigging. The door offers the greatest difficulty in adapting the cabin to the uses of a boat; yet it too could be secured by bolts and bands; and when used as a boat, the door could be rendered water-tight, by tongue pieces of iron, fitted into grooves in both the door and door-frame, these being packed properly with India-rubber, and being capable of instant adjustment, by means of a rack and pinion; the tongue pieces would, of course, be drawn in when the door formed part of the cabin, but would be projected into the grooves to convert the cabin into a boat. Of course such a door would militate somewhat against the boat being what is known as a "life-boat;" yet, as the door would be narrow, it would not do so to any serious extent; disguising the boat-like appearance of the cabin, would be a board, fitting from the curve of the boat to the deck of the vessel, and forming a step into the cabin. This board could easily be removed when the boat was to be launched.

"When used as a cabin, masts and spars could be stowed away under the curve of the boat, behind the screw of the curve and the keel. The space where the bow of the boat was squared off into a cabin-like appearance, would answer for sails, which, with the masts and spars, could quickly be put in the boat when required. The cabin windows, commenced above the gunwale of the boat, would be in the sides of the raft, which, from its nature, would not require water-tight sides. Around the boat, seats could be fitted as in our ferry boats, the arms of which would serve as so many braces to the boat, adding to its strength. Under those seats could be tight compartments for provisions, water, and all sorts of stores, including water-proof clothing, and a cover to form an awning, if required.

A compass, and everything requisite to supply a boat isolated on the great deep, could be stowed away in the many suitable places, not only for the occupants of the boat, but the raft and other boats might find a short supply. Yet, these arrangements would, in no wise, detract from its uses as a cabin, a sitting or smoking-room, such as steamers especially require.

The brackets that might serve as ornaments to the upper part of the cabin would add to the strength of the raft, and the cornice work of it could be hollow, for useful purposes. Thus could be had a boat, constructed partially as a life-boat, well provisioned, and a raft, also made exceedingly buoyant by filling the spaces between the outer and inner covering with scraps of cork well packed; such a cabin constructed of sheet-iron and lined with the same, or zinc, or even thin strong wood, would not be much heavier than any ordinary cabin; and though it would have less interior space, yet, if we consider its usefulness, and, also, that many ordinary cabins have a deal of space occupied with pillars and ornaments, it could be of no disadvantage on that account.

"It may appear as if such a boat would be difficult to launch; yet such would not be the case, though it might be so with the raft. But it must be considered that it would only be launched from the utmost necessity. In some instances, such as the North Star might have afforded, it would merely have to be detached, and then floated off. We cannot imagine, without horror, what would have been the fate of that steamer and all on board, were it not for the fortunate circumstance of the "Saranac" being within reach; even as it was, it was a singular piece of luck that she was gotten off at all.

"In nearly all instances of great disaster, it has been owing to the opportune proximity of some passing vessel, that the passengers and crew were saved. In how many instances, within the last few years, have crews and passengers been lost, their boats being unable to save them? Possibly, in many cases, unknown to us, they have held them above water with sails, resting there helpless for days and weeks, merely to linger on in fearful misery, to die of more fearful starvation and thirst. The numerous instances where such have been picked up, attenuated skeletons, just on the verge of death, some to die of fever after being rescued from starvation, only prove that the passengers and crews of many missing vessels have passed through the same horrors, unable to survive them, one tale for most; no food—no drink—no compass—no sails—no shelter—hurriedly crowded into small boats, mingled hope and despair their only companions on the watery desert.

"But the launching of the cabin-boat is not to be attended with trouble;

the long known "launching frame," though not in common use, enables the putting of a boat into the water in safety, with but very little assistance, and in a very short time.

"The 'shocks' are set on a stout plank, which turns on a pin with an oval head. When the boat is to be launched the bulwarks are taken down, and, all other fastenings being loosened, the boat is turned on its pivot, when the oval is unlocked, by the slot beneath corresponding to its shape, then, watching an opportunity, the boat is pushed off to leeward; probably at a moment when the bulwarks nearly touch the sea.

"In making this suggestion, it is quite probable that I have made some technical errors, but the question for practical men is the feasibility of the project; the shipbuilder would soon find out the best mode.

"If the plan is reasonable and useful, it is the duty of this Institute to engage attention to it, or some other plan by which every ship should be forced to carry a large boat well stored with provisions, &c.; and if such boat can be had out of a common convenience, and be a life-boat also, so much the better for the arrangements of the ship.

"The time is coming, and ought to be at hand, when the legislature will not allow a vessel to go to sea without every possible precaution for saving life in cases of storm or accident."

Mr. Tillman considered the subject of importance. There is a large factory of metallic life-boats in this city—Francis's. In remarking on the device proposed by Mr. Garbanati, he said that there has been a patent taken for using the cabin to preserve life, but not as a boat. Nests of boats—that is, sets of boats, fitting one inside of the other, would meet, to some extent, the difficulty of stowage, and might be employed with advantage; and, indeed, all parts of the vessel might be made buoyant to help and save life when there is need. Nest boats could be made of metal so that they could not be stove in, and by being made self-buoyant they could not swamp. The suggestion of Mr. Garbanati to make ships' bulwarks buoyant, is excellent; these, when so constructed, could readily be formed into rafts. He would further suggest the rendering of every separate article of furniture a life preserver—bedding, seating, utensils, &c., &c.

Mr. Sykes considered it best to make the whole ship a large life-boat, by dividing it into compartments by water-tight bulkheads. When ships so constructed have been wrecked, most of the lives were saved. We have means enough to save lives—we only want to legislate, and compel the use of these means. Every man has an interest in this. All producers have to pay their quota when any property is lost, or when insurances on lives have to be paid. He would suggest the formation of a skeleton raft on the deck, by bulwarks running along the centre fore and aft, and connecting at midships with the outer bulwarks, so that when the vessel sunk this should float.

Mr. Garbanati stated that all the ships lately lost were formed with water-tight compartments—the Indian, Royal Charter, &c. Instancing the wrecks of the North Star, Sarah Sands, and Birkenhead, he asked—"should we not seek to save some lives because we cannot save all?" Speaking of the nest boats, he said: "The storm which wrecks a gallant ship is not to be trifled with; nest boats would be useless in it—they may do for river steamers, or for smooth water; but, on the mighty Atlantic or Pacific, when the waters are lashed into fury by a storm, they would be as unavailing as bubbles. The horrors of starvation and thirst would await their hapless crews, even if they should outlive the gale. There must be one well-appointed, well-provisioned, large boat, around which the smaller ones could assemble, and from which they could get succor.

The loss of the President shows that her crew had no means of saving life. The top of the cabin, in this plan, makes a raft, while the bottom forms a boat. A ship's bulwarks can be taken down to form a raft—there are, in fact, plenty of means of making rafts; but, they are of little avail. In a storm there is no time to make contrivances: all is hurry and confusion. The boats usually get stove in or swamped, as in the case of the Indian. The common boats, in short, cannot be got out without being lost. Nothing will live in a rough sea but a well-built strong boat, that will float even if filled with water. Nest boats are too small; we must insist upon having a good plan adopted, by whomsoever invented. Scientific men must use their efforts to call attention to the subject. We have fire-proof buildings, yet we find it advisable to use fire escapes—and, certainly, ships in compartments are not safer than fire-proof buildings.

Mr. Howe thinks there is a difference between buildings and ships in regard to legislation. No one is sufficiently interested, personally, to compel the building of ships; we won't allow a dangerous building near ours, because we have a personal interest at stake. Nest boats ought not to be condemned—they will yield some and not stave.

Mr. Seeley.—We are differently circumstanced from our ancestors. There is now so much commeree that a life-boat could now be employed with advantage; it could not in their day—for the chances of being picked up were then so few, that the horrors of canibalism awaited those who were saved in boats. A life-boat on ship board, when not in use, is greatly in the way; we ought to have floating rafts—they are more useful, and will buoy up more than a boat, and be as efficient in saving lives till their crews are picked up by passing vessels. They can be readily put and kept in order. Within a month or two there has been a patent taken out for a cabin, which can be cut out and will then float away. The nest boats are an excellent suggestion, they so completely meet the difficulty of stowing. I would suggest the employment of India-rubber cloth to form rafts; they could be readily blown up, be made in sections, and be stowed away with perfect ease—one weighing 50 lbs. would be adequate to the saving of a whole crew. The cloth preserves its elasticity in water, and would not be torn by the action of the waves. True, they could easily be punctured; but, by being made in sections, they would still, after being punctured, be very buoyant.

Mr. Haskell.—There has been a patent taken lately for a life-boat with all appliances within itself. It is 32 feet long, carries 32 passengers, has a propeller in the centre, worked by crank handles, and is intended to be kept ready on shipboard for any emergency.

Mr. Stewart noticed a new invention of the past summer, a mattress made of common cane; it is light, buoyant, and cheap.

The subject of Aeronautics being then called up, Mr. Stewart apologized for not being ready with his paper. The death of Washington Irving called him out of town. He had the unfinished paper in his pocket, and would read it another night; now he preferred to make *viva voce* remarks.

The experiments tried with balloons, the money and ingenuity expended on their construction, have demonstrated they can never be used, except for special observation; never for the transportation of freight or passengers. All efforts heretofore made to guide balloons have proved failures. In consenting to read a paper on the subject, it was my intention to have the character of the Club and of the Institute used, to frown down all such foolish attempts, so often made, where life and health are trifled with by unscientific enthusiasts. At the request of the inventor's wife, I, and several scientific men, went to Hoboken, some time ago, to take down the cigar boat; and I have since several times used my efforts to dissuade men from such chimeras. Mr. Lowe was certainly sincere in his undertaking, and would risk his life and property. We should dissuade such enthusiasts from ruining their families. With these views I consented to read a paper.

Mr. Tillman wished to bring the subject down to the two following propositions:

1. It is impossible to navigate the air by the aid of balloons. If any one crosses the Atlantic it will be by chance.

2. It is possible to make a car which can be propelled through the air, but is not itself buoyant.

Mr. Seeley.—If gas could be cheaply procured and preserved in balloons, they might be of some use; but hydrogen cannot be confined; it will pass through paper as if nothing were to obstruct it; it will even pass through gold foil. Air is thirteen times heavier than hydrogen, which, as soon as discovered, about 1776, was at once suggested for balloons; but nothing could be found to confine it except soap bubbles. It is so subtile that it permeates everything. They succeeded in making balloons with paper and cotton cloth, but these soon came down. Now India-rubber varnish can be employed, but the gas so soon escapes that no man dare venture on a journey of three or four days. The little French balloons are made of sheet India-rubber, so cut that the edges cement themselves again. I could not get rubber of uniform thickness until a friend gave me some, such as is used for making Mackintosh cloth. When the balloons are formed they can then be vulcanized; but still the gas escapes in a little time. Varnish or anything else that increases the thickness of the balloon, lessens the liability of leakage, but they also increase the weight, which is a serious evil. Colodion balloons are made in a Florence flask by pouring in a little colodion, and turning the flask round to have all parts covered equally with it. It dries soon, and can be drawn out and filled with hydrogen. Such balloons look beautiful, and last a few minutes in the air.

The discussion was carried on for some time longer in the form of a conversation, after which the subject for the next evening was selected, viz.: "Head coverings, and the machinery employed in their manufacture."

The Association then adjourned.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE,
December 8, 1859.

President Mason in the chair. Mr. Garvey, Secretary, pro tem.

The Miscellaneous business being called up,

Mr. Fisher read a short communication from himself to the club, on steam-wagons on common roads, with especial reference to the employment of steam omnibuses in cities. He detailed his own efforts to obtain permission from the city authorities of New York to run a steam hackney coach in this city, and the legal quibbles by which he was opposed, after which he proposed to the Polytechnic Club to use their influence as a scientific body to bring about the formation of a club, who should be joint stock owners of one or more wagons, which they and their friends could use as private vehicles, unless prosecuted as nuisances, in which case evidence should be given to prove them such.

Mr. Fisher's views were warmly supported by the meeting, and Messrs. Seeley, Johnson, and Butler, were appointed a committee to aid in carrying them out.

Prof. Hedrick took up some properties of the natural numbers which Mr. Tillman had introduced to the club on a former occasion, and gave the following demonstration of the proposition that "The square of the sum of the natural numbers, up to any point, is equal to the sum of the cubes of the natural numbers taken up to that point."

The demonstration was as follows, viz:—

Let S = the sum of the natural numbers to n,
and S' = " " to $n + 1$

$$\text{then } S = n + \tfrac{1}{2} n (n-1)$$
$$S' = n + 1 + \tfrac{1}{2} n (n + 1)$$
$$S' - S = 1 + n,$$
$$S' + S = (1 + n)_2,$$
$$(S'-S)(S' + S) = S'_2 - S_2 = (1 + n)_3,$$
$$S'_2 = S_2 + (1 + n)_3,$$

That is having the square of the sum of the natural numbers up to any point, as n, by adding the cube of the next number, we obtain the sum up to the next higher number, or to $n + 1$.

$$\text{If } n = 1, \quad \text{then } S = 1, \quad \text{and } S' = 3,$$
$$n + 1 = 2,$$
$$S'_2 = 3_2 = 1_2 + (n + 1)_3 = 1 + 8 = 9 = 1_3 + 2_3,$$

Therefore we have the general equation

$$(1 + 2 + 3 + \&c. + n)_2 = 1_3 + 2_3 + 3_3 + \&c. + n_3.$$

Mr. Garbanati was glad to find that a sister society, "The Newark Engineer's Protective Society," took a lively interest in our proceedings.

The subject of the evening being called up, Mr. Poll read the following paper:

HEAD COVERINGS—AND MODE OF MANUFACTURING HATS, CAPS, &c.

Contrivances for protecting the head from atmospheric influences are infinitely diversified, and nearly all nations removed only one step from barbarism, have made use of some dress for this important purpose. As far as I can learn, the Egyptians, in ancient times, generally went about their daily occupations with their heads entirely uncovered. The great warriors of antiquity were accustomed to go to battle at the head of their bare-headed troops. The savage tribes inhabiting the wilds of Africa are always bare-headed; and when our minister recently approached the walls of Pekin, he passed through tens of thousands of bare-headed Chinamen. The ancient Saxons were not accustomed to wear any coverings on the head, their maxim being that the head should be kept cool, but the feet warm. We, as a people, have become so perfectly artificial in all things, that it would be death to us to practice such a habit.

The inhabitants of Turkey and several of the Asiatic nations wear, at the present day, turbans composed of folds of silk, muslin, or cotton fabrics, which are not taken off even when they enter their habitations. This practice causes them to be tender, and weakens their constitutions.

Before hats were invented, the Europeans wore woollen caps made into various shapes and forms, and they are still much used in the manufacturing districts of England and France, and among the Scotch highland peasants, on account of their cheapness. In Germany, Poland, and Russia, caps made of the skins of various animals—cats, rabbits, lambs, &c.—are much worn, and they are frequently ornamented with feathers.

Caps made of varnished leather are much used in America and England at the present day, particularly by young persons and mechanics—sometimes by travellers, to keep off the wet, and sleep in, when placed in positions where hats would prove inconvenient.

The ancient Greeks wore hats similar to those which are now in general use in this country and Europe, and made, too, as we make them, of silk, willow, straw, felt, etc. When the process of felting hair and wool was invented is not known. The inhabitants of Tartary used felting for hats and tents; and hats made of felt were used by the Saxons, Romans, and Greeks.

The chronicles of Froissart make mention of hats of the time of Edward III. and Richard II., and hats made of white felt were worn as the badge of a certain political party at Ghent. But they did not become universally used until the extravagant reign of Henry VIII.; even then riding hats were thrown aside, and cloth hoods and woollen caps worn instead. During the reign of Queen Bess, high-crowned, conical hats were all the rage, but were restricted by Parliament to the higher circles, and the middle classes were compelled, under the penalty of a heavy fine, to wear knit woollen caps. This act remained in force three years, when great complaint was made, and it was repealed, after which felt hats were worn by all classes.

King Charles, in the year 1638, prohibited, by an act of Parliament, the importation of hats made of beaver fur, and from that time to this they have been considered more valuable than any other description of hat.

During the Commonwealth, and a long time after it, hats were made with very broad brims, and the hats now worn by that worthy class of people known as Quakers, are a remnant of those times. After a time they were turned up at the sides, and were finally converted, in the reign of Ann, into three-cocked hats. In 1749 the lower orders adopted the round hat, being cheaper, and the gentlemen wore the cocked hat by way of distinction. In 1789 they, likewise, finding the cocked hat heavy and inconvenient, abandoned its use, and assumed the round hat, which has been universally worn since in America and all European countries, and is only varied by the hatter, from high to low, with a brim wide, narrow, or turned up at the sides.

In China, feathers placed in the hat are worn by the mandarins as a mark of dignity and station. They are generally plucked from the tail of the dunghill fowl. The Welsh wear leeks, the Irish the shamrock, the Scotch the thistle, in several of their public festivals, in their hats; and the English oak leaves, in memory of Charles II., who once hid himself in an oak. The Bourbons and the Stuarts wore white cockades, and the Elector of Hanover black. These are now called favors, and are only used by servants on state occasions, marriages, funerals, etc. It then became fashionable among the wealthy, to substitute magnificent jewels for cockades, and at the same time they had their hats bound with silver and gold lace, all of which have given way to the black band now universally worn.

Hats of felt are made of wool and hair, which form the foundation, the outside of which is finer than the inside; and when the fur of the beaver is worked in, it is called a beaver hat; and the qualities of the hat are governed by the varieties of hair made use of in the manufacture.

The first process of making felt for a hat, is to separate the fibres, and lay them in every possible direction with regard to one another. For this purpose a bow and string were formerly made use of, which scatter the material far and wide, and cause it to fall in layers; these are brought into the proper form by hand, and wrapped in a wet cloth; it is then placed upon a warm iron plate, and pres ed by hand, and sprinkled with water, until the mass becomes consistent from the entangling of the material together. Before the felting is finally finished, the required fur is placed on the outside with the hairs all pointing in one direction, which are made to cover the felt completely; and upon the evenness with which this operation is performed depends the value of the hat. The hats are then shaped into a sugar-loaf form, and boiled in an alkali, and again felted with warm water, then placed upon a block and worked into shape, after which the rim is trimmed, and the hat dried; a wire-brush is then applied to take off any coarse hairs that may exist, and the hat is smoothed with seal-skin, and dyed, after which it is made stiff with gum-senegal or glue, which is prevented from passing through the surface by the use of beer grounds placed on the inside. If it is desirable to prevent the hat from becoming softened when exposed to a rain storm, gum-shellac, mastic or sanderach, dissolved in naptha, may be used, or India rubber will answer the purpose. Steam is then brought to bear upon the hat which softens it slightly, and it is then ironed and brushed until the required polish is produced; lining and binding complete the operation.

The skin taken from an animal known as the Neutria, a South American water-rat, is much used now for hat-making. The number imported last year amounted to nearly one million.

Silk hats, so much worn in the United States and France, are made by attaching silk plush to any suitable substance, such as felt, cotton, pasteboard or chip—the annual value in England is $15,000,000. When these hats become wet with rain, they should be wiped dry with a silk handker- and then brushed smooth; if this not done, the nap will become rough, and brushing will have no effect upon it.

Straw hats are generally worn in summer by men and women. Dunstable has been celebrated for their manufacture for more than one hundred and sixty years; they were first made of whole straw, platted in strips; but, after one hundred years, they learned how to divide the straw. When wheat or rye straw is used, it is cut at the joint, and the outer covering is removed, after which it is split by a very simple instrument. When it is ready to be platted, the plats are sewed together, blocked, pressed, wired, lined, and formed into bonnets and hats of every desired fashion.

When it becomes necessary to clean a straw hat, light a few matches in the bottom of a barrel, and hang it up therein; when taken out it will look like new. Or you may dissolve chloride of lime in rain water, and dip the hat in it, when the same effect will be produced.

Of all straw hats, known, those manufactured at Tuscany are probably the finest in the universe. The straw is produced from a small variety of wheat, grown upon an arid soil, which is bleached on the grass as we bleach flax; it is naturally white, exceedingly strong, and is never split. I saw a hat, made of wheat straw, at Florence, valued at $300.

Chip hats are made from thin strips of wood, cut by a plane. Willow hats, from strips of willow, woven in a loom, and afterwards whitened by bleaching.

Mr. Veeder proposed a committee to obtain accurate information on the methods, machinery and statistics of this branch of manufacture. Messrs. Garbanati, Johnson and Howe, were so appointed; and, at the suggestion of Mr. Tillman, Mr. Bebee, curator of the Cooper Institute, who has been an extensive hat manufacturer, is to be requested to read a paper on the subject, to take another aspect of it, different from that which Mr. Pell has taken in this evening's paper.

The subject was then laid on the table till the next evening, and Mr. Stewart was called upon to read his paper on Aerial Navigation.

H. L. STEWART'S PAPER ON AERONAUTICS.

Aerial navigation is not wholly of modern growth. The Greeks and Romans, wise men of the middle ages, and philosophers of succeeding eras, as well as enthusiasts of the present time, have believed it possible for men, by the aid of artificial appliances, to swim in air as well as in water. This was proposed, at first, to be accomplished by aid of artificial wings. The mythological story of Icarus, whose waxen pinions melted on his near approach to the sun is no doubt, founded on an actual experiment.

The first flying machine of which we have a circumstantial account is the wooden pigeon of Archytas, launched in the fourth century, and described by Aulius Gellius.

Friar Bacon and Albertus Magnus, each claimed the honor of the invention of the art of flying; and later, Bishop Wilkins, in his "Discovery of the World," describes a carriage constructed with sails like a windmill, the force of which was designed to drive it through the air. In fact, there was scarcely an investigator of the occult sciences in the middle ages, from the learned alchymists, necromancers and astrologists, to the hags who were supposed to ride nightly on broomsticks to join the witches' revel upon the Hartz Mountains, that had not the reputation of being able to ride at will on the wings of the wind—a reputation to which most added by speculating on the means necessary to produce this effect. By degrees, the science of flying, with alchymy and astrology, fell from the hands of the learned to the inheritance of the ignorant pretenders, who used it as a means to delude the credulous populace.

In the reign of James IV., cf Scotland, an Italian alchymist visited the court, and so far ingratiated himself into the royal favor, by his promises of furnishing, through his art, an unlimited supply of treasure, as to obtain the grant of an abbey and encouragement in his schemes. Failing, after repeated trials, to transmute clay into gold, and finding it necessary to sustain the wavering faith of the court, by some new device, he manufactured a pair of immense wings, composed of varied plumage, with which he proposed to fly to France, from the walls of Stirling castle, and actually took flight; but was stopped in his career by coming suddenly to the ground, breaking his thigh in his fall. With ready wit, he excused the failure by saying that he had unwisely made use of the feathers of dung-hill fowls, which tended to the earth through natural sympathy; had he used eagles' pinions he should assuredly have taken an upward flight. The excuse satisfied the credulous people; but we do not learn that his experiment—the first authenticated one of the kind on record—was ever repeated.

A second attempt was made a century after, in 1617, at Tubingen, in Wirtemberg, by a monk, who, incited to the adventure by a rector of a grammar school, named Fleyden, who had demonstrated learnedly in a treatise, the Art of Flying made Easy, took flight, provided with a pair of large wings, from the top of a neighboring tower. His ponderous machinery failed to sustain him; he fell to the ground, broke both his legs, and died in consequence not long after.

It was not until 1670 that strong ground was taken by Borelli against this kind of aerial navigation in his treatise, *De Motu Animalium*, in which, by a comparison between the muscles that act on the wings of a bird with those of the breast and arms of a man, he proved the latter to be insufficient to strike the air with force enough to raise him from the ground.

The first idea of constructing a body that should rise in the air by its own power, was suggested in the fourteenth century, by Albert, of Saxony, an Augustinian monk, and a commentator on Aristotle, who, accepting the then popular idea, that fire was floating above the atmosphere of the earth, maintained that if it were possible to bring down a portion of this more etherial substance, and enclose it in a ball or globe, it would float in the atmosphere; while the admission of the air from without would cause it to descend in like proportion. Here was the base of Montgolfier's discovery.

In the beginning of the seventeenth century, Francis Mendoza, a Portuguese Jesuit, revived the theory of Albert, of Saxony, maintaining that the combustibility of fire was no objection to its use in balloons, since its laxity, and the exclusion of air, would prevent its ignition; in this he was supported, in Germany, by Caspar Schott, who declared that such a vessel, furnished with rudder and sails, could safely navigate the sky.

Various theories of aerostation continued to be agitated from time to time, the chief of which proceeded from the Jesuit Francis Lana. He proposed to employ hollow balls of copper, which, exhausted of their air, would become specifically lighter than the surrounding medium, and thus ascend; but this theory, defective in many of its calculations, was entirely annihilated by the fact that these balls, if light enough to float in the atmosphere, would be entirely too thin to resist its external pressure.

In 1709, Friar Guzman, of Portugal, projected a flying machine, constructed somewhat in the form of a bird, with long tubes, through which air was to pass to fill wings that were to elevate it. and obtained the royal patronage to a considerable degree; but the only fruit that ever resulted from this theory was the ascent of a paper basket 200 feet in the air, which won for the good father the reputation of a conjurer.

The era of the modern balloon was now approaching. In 1766, Henry Cavendish discovered that inflammable air was specifically lighter than the common atmosphere, and suggested to Dr. Black, of Edinburgh, that a bladder filled with the former would rise and sustain itself in the latter. Experiments based on this theory were made by M. Carvallo—first with bladders, that proved too heavy; then with Chinese paper, that proved permeable to the vapor; and lastly, by blowing up soap bubbles, inflated with inflammable air. Just at this period, the announcement was made that the theory had already been realized in France, by the brothers Stephen and Joseph Montgolfier; the former and younger of whom was the first to entertain the idea of navigating the air by the new method. The balloons first used by the brothers Montgolfier consisted of a spherical bag of linen, buttoned together. This was suspended on cross poles, and the air within rarified by a fire of wool and straw kindled beneath; but the rarified air soon escaped through the pores of the linen, and the balloon, in consequence, fell to the ground. This difficulty was afterwards obviated by covering and lining the balloon with varnished paper, while the fire was kindled in a vessel, suspended below, and increased or diminished as the navigator desired to mount or descend.

The first public balloon ascension was made from Annonay on the 5th of June, 1783. The balloon rose to the height of a mile, and floated along for ten minutes, then losing its buoyancy, fell to the ground.

The success of this experiment created a universal sensation throughout Europe, and was repeated at once in France and other countries. Euler employed his dying moments in dictating an application of his favorite analysis to determine the ascending motion of a balloon. Other experiments were made on a larger scale; and on the 20th of September, 1783, a large balloon, filled with rarified air, or fire balloon, as those of the Montgolfier construction came to be called, was sent up from Versailles, under the direction of Joseph Montgolfier, in the presence of the king, queen, and court, containing a sheep, a cock, and a goat, the first aerial navigators, who came down in safety eight minutes after, two miles from the place of their ascension.

The first human aeronaut was Pilatre de Rozier, a young naturalist, who, after a trial trip alone in a balloon, secured by cords, took flight over the roofs of Paris, on the 15th of October, 1783, with the Marquis de Armange, and alighted, after a journey of twenty-five minutes duration, six miles from the point of starting.

Just before this time, experiments had been made by MM. Charles and Robert, in the construction of balloons of silk, covered with caoutchouc varnish, and inflated with hydrogen gas, generated by the action of sulphuric acid upon iron filings; and, on the 1st of December, 1783, the two experimenters ascended in a balloon of this construction, from the Tuileries, and alighted, an hour and three quarters afterwards, twenty-five miles from Paris.

The first balloon, in England, was launched on the 25th of November, 1783, under the direction of Count Zambeccari; and the first ascent made on the 15th of September, 1784, by Vincentio Lunardi. During the following year, Mr. Blanchard and Dr. Jeffries were the first to cross the British Channel.

Balloon ascensions now became things of frequent occurrence, and the navigators turned their attention to means whereby to propel and steer them, yet without much effect. Guyton Morveau made use of oars, which he claimed to be productive of some results; yet these were soon broken by resistance, and were insufficient to guide the machine. Sails were tried; but it was found that these, so effective when applied to a vessel whose velocity is less than that of the wind, availed nothing in the air where the velocity of both wind and balloon must be the same; wings of different constructions proved alike ineffectual, and the navigators were, at length, compelled to confine themselves to raising or lowering the balloon at will, in the rarified air balloons, by increasing or diminishing the fire; and in the inflammable air balloons, by permitting the gas to escape through a valve, as the only practicable means of governing the course of their vessel by taking advantage of the different currents of air that lie above the variable atmosphere nearest the earth.

In 1785, Blanchard, prompted by the fate of Rozier and others, who had lost their lives by the destruction of their balloons by fire and other means, constructed the parachute to enable the traveller to desert the balloon in case of accident, and descend at a uniform rate.

The French Revolution now broke out, and the balloon soon after began to be applied to practical purposes in reconnoitering in war. It was first used to effect this on the plains of Fleurus, where the victory of Jourdain, over the Austrians, was chiefly attributable to telegraphic signals made from a balloon under the direction of Guyton Morveau. They served a more valuable purpose in the voyages of MM. Guy de Lussac and Biot, in 1804, in determining the degrees of magnetic force at great elevations. Two ascensions were made during this year by MM. Biot and De Lussac, the first to the height of 13,000 feet, and the last to the height of 23,000 feet, and valuable results obtained for the science of meteorology. In 1806, Carlo Broschi, the royal astronomer at Naples, with Signor Andreani, the first Italian aeronaut, attained a height exceeding this elevation, but the atmosphere became so rarified as to burst the balloon, and the adventurous voyagers were precipitated to the ground. Both escaped at the time with their lives, owing to the checking of the velocity by the fragments of the machine, but Broschi contracted a disease in his flight of which he died not long after.

The longest aerial journey in Europe on record, was made from London, in 1836, by Messrs. Holland, Mason and Greene, who alighted eighteen hours after starting, in the neighborhood of Weilberg, in the duchy of Nassau, five hundred miles from the place of ascension. The first balloon ascension in America was made in 1796, from the city of New York, by Blanchard the English aeronaut.

The next important step in this direction, on this continent, was also made in the city of New York, by Mr. Thomas Robjohn, a distinguished chronometer and organ maker, in 1847. Mr. Robjohn's experiments consisted of several balloons of different sizes, made in the form of a cigar and moved by screw propellers, turned by means of a coiled spring, and by a small engine worked by steam, generated by a spirit lamp. With these machines he succeeded in obtaining a speed of from four to seven miles an hour, in the old Broadway Tabernacle, and, I believe in the Merchants' Exchange, and other places in the city of New York. Encouraged by these results he commenced the construction, at Hoboken, N. J., of a grand balloon carriage, consisting of a gas receiver, two hundred and seventy-three feet long, and twenty-eight in diameter in the centre, resembling an immense cigar in its general form, and calculated to have an ascending power equal to about fifteen tons. To this was suspended a car, sixty feet long, to which was attached a steering apparatus, a pair of screw propellers, revolving on either side near the centre of the car, and by means of a pair of oscillating engines of twelve horse power. This machine was very nearly completed and ready for inflation when the means of the enterprising inventor gave out, and he was obliged to suspend operations, and fence in and house his balloon on the site upon which it was erected, where it remained for more than a year, when a movement was made by H. L. Stewart and others to get it into operation, and a plan was devised to secure the rental of the ferries between New York and Hoboken, with a view of raising, from the increased travel during a number of days, a fund to carry the experiment into complete effect. On examination, the cigar-shaped balloon was found to be seriously damaged by mildew, and entirely incapable of retaining the gas—and the machine was dismantled and the enterprise abandoned. The engines may be seen at Cornell's Iron Works, on Centre street, where they, with a considerable portion of the machinery, are at present stored and for sale.

The veteran aeronaut of the present day is John Wise, whose celebrated voyage with La Mountain in the balloon Atlantic, from St. Louis, twelve hundred miles eastward, landing near Watertown, Jefferson Co., N. Y., is too recent to need further mention. The widely-heralded enterprise of Mr. Lowe, promising a voyage across the Atlantic in his monster balloon, or air-ship, as his friends choose to term it, the City of New York, has not yet been brought to a test, and some think, though I do not, that it was never intended to be.

Some unimportant debate followed the reading of Mr. Stewart's paper, after which the Association adjourned to the following Thursday, having selected "Clothing," in addition to "Head coverings," as the next regular subject.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE,
December 15, 1859.

President Mason in the chair. Mr. John Johnson, Secretary pro tem.

The minutes of last meeting having been read and approved, the committees appointed last evening were called upon to report, when Mr. Johnson handed in a report on "Steam Wagons."

The subject of "Clothing" was then taken up, when the President made some interesting remarks upon the various forms of clothing used for the neck at different times. The Greeks and Romans appear to have left the neck uncovered; they appeared in the forum and on state occasions without anything like our cravat or stock. This seems to have originated with the soldier, and it would be an interesting thing to trace its rise, and the cause which led to its adoption—it may have originated in some article of defensive armor, or from the desire to enforce an erect bearing, as being most suitable for the profession. We, of modern days, adopt the style and color of the soldier, leaving the white almost exclusively to clergymen. This is, doubtless, because we are a more warlike race. At the conclusion of his remarks, the President asked if any gentleman was prepared to read a paper on the subject of "Clothing in General." No person being so prepared, at the request of several members, Mr. Pell proceeded to give a review of the subject in its historical bearings.

MR. PELL ON CLOTHING.

The clothing of man is principally obtained from four raw materials, silk, wool, cotton, and flax. The wool of the sheep was the first substance manufactured into cloth among the mountainous regions of Asia. Linen was first made in Egypt, as flax was indigenous to that country. Silk in China, as the silk-worm was heard of first as originating in that part of the globe. Cotton fabrics in India, as the cotton plant originated there. God gave wool-bearing animals to cold countries, because they yield the warmest covering for those inhabiting them; and cotton to tropical climates, being the best substance for such regions.

The skins of animals were the earliest covering made use of by man, and they continued to wear them long after the art of weaving was thoroughly understood. Hercules is said to have worn the skin of a lion; and even Æneas wore a vest made of a wild animal's skin, when he took his departure from Troy. Alcestes wore the skin of a bear, and probably looked very much like some of our uncivilized western hunters.

Garments, manufactured from wool, possess many advantages over the other materials named, owing to the elasticity of its filamentous texture—light articles, of great warmth, may be made of it. And further, it has a tendency to preserve those persons who may unavoidably become exposed to epidemic influences, when worn next their persons. Linen next to the skin is more favorable to cleanliness than woollen, because it does not absorb as much perspirable matter; but it becomes sooner saturated with moisture, and requires to be more frequently changed. It feels colder to the skin than woollen, because it is a good conductor of heat, and thus robs our bodies of it rapidly. Silk is a warm material, but seems much better adapted for external than inner garments; it is an elegant dress for ladies, and possesses, as a covering, several valuable qualities. Furs certainly excel, as far as warmth is concerned, all other known materials; but as woollens answer every purpose with us, they are generally used for show.

England has been for very many years famous for its wool, still, the art of weaving it was not much practiced there before the year 1330; up to that period they imported their fine cloths. Edward III., after his marriage to Phillippa, imported woollen manufacturers into England; but they did not make much progress in the manufacture until the time of Henry VIII. It grew into much importance about the time the Duke of Alva persecuted the weavers in the Netherlands, who fled in great numbers to England, and were most graciously received by Queen Elizabeth, who gave them liberty to settle in Norwich and other places. England did not export woollen fabrics until the reigns of Edward VI. and Queen Mary. In 1770, she manufactured $20,000,000 worth. Arkwright invented a wool-carder and spinner, which produced a complete revolution in the woollen trade, and enabled the manufacturers to give up hand-spinning, and use the mechanical power of water and steam. Cloths are undoubtedly the most important articles in the manufacture of woollen, and the best are made of Spanish and Saxon wool. The goodness of cloth arises in a great degree from the quality of the wool. Cloth, to be good, should be of a soft and even consistency, and devoid of a satiny appearance, as this generally causes it to become spotted by rain. Cassimere is a twilled cloth, possessing a greater degree of pliability than plain cloth, it is made by placing one third of the warp above, and two below each shoot of the weft.

Pelisse cloths are twilled. Dreadnaughts are thick cloths with a very long pile. Swanskins are closely woven cloths. Hodden Gray is manufactured from natural black and white fleeces.

Linen is a fabric of extreme antiquity—in the time of Pharaoh it was the national manufacture in Egypt. It was exported by the Egyptians in the days of King Solomon. I have a specimen, supposed to be more than three thousand years old. The Greeks, Romans, and Jews were taught its manufacture by the Egyptians; and it was first only used by them as clothing for royalty. It did not come into common use in England before 1252, and was first introduced by the Flemings. At present, the Scotch and Irish looms produce enough for our country and Great Britain.

Cotton fabrics for dress are wrought very cheaply by machinery, and have superseded to a great extent, not only linen, but silk and wool. Cotton is admirable for sheetings and shirtings, as well as dresses for ladies. The inhabitants of Asia were acquainted with the fabrication of cotton at a very early period. Herodotus speaks of cotton cloths, four hundred and forty-one years before Christ, as the common clothing of the inhabitants of India. Arrian, who lived in the second century, and also Strabo, speak of cotton fabrics. Pliny states that it grew in Upper Egypt, but it was not manufactured anciently by that people, as it is not found encircling their mummies. William de Rubriquis says that cottons were used in 1251 by the inhabitants of Southern Russia, and Marco Polo saw it in China in 1367 or '8. It was brought to England in the reign of Queen Elizabeth, who protected and patronized its manufacture, and it is scarcely possible to convey an idea of the variety of cotton fabrics that have issued from the weaver's loom from that time to this.

SILK FABRICS FOR DRESS.

Civilization must have progressed very far indeed before man made the discovery that silk could be produced by so insignificant a caterpillar as the silk worm, and that the little yellow balls which were attached to the leaf of the mulberry, could be unwound into tissues of such endless variety and beauty. The first silk was, without doubt, made in China; for many years the most celebrated women, from the empress down, were accustomed to rear and feed silk worms, and employed themselves in winding and weaving the silk made by them. From China, the eggs of the worm were carried into Persia. The Emperor Aurelian, who died A. D. 275, refused his empress a silk dress, on account of its cost. The nature of the silk worm was utterly unknown in Europe until the reign of Justinian, A. D. 555. At this time two Persian monks went to India, and brought over the eggs of the silk worm secretly, in hollow canes, and these were the progenitors of all the generations of silk worms since reared in Asia and in Europe. Their first diffusion in Italy was the consequence of the invasion of Greece by Roger I., king of Sicily, who carried several silk weavers to Palermo. Francis I., of France, in 1522, began the silk manufacture at Lyons, which has constantly flourished since. After the Norman conquest silk dresses were worn in England. Several caterpillars beside the silk worm spin silk. Spiders form balls of silk to enclose their eggs. The young branches of the paper mulberry afford a species of silk. Cloth resembling silk has been made from the stalks of nettles, stalks of hops, various grasses, &c.

LACE.

This beautiful fabric is, without doubt, one of the most ornamental additions to dress, and one of great antiquity, as it may often be seen bordering dresses in pictures of Grecian beauties. Antwerp, Mechlin, and Brussels, have long been celebrated for the perfection of its manufacture. In the time of Charles I., Queen Anne, and George I., laces were much worn.

Brussels is still the most valuable of all laces. Brussels lace has a hexagonal mesh, formed by twisting and plaiting four threads of flax to a perpendicular line of mesh. Mechlin is formed of three flax threads, plaited to a perpendicular pillar. Valenciennes is an irregular hexagon, formed of two threads, plaited at the top of the mesh. Lisle is a diamond mesh, formed of two threads plaited to a pillar. Alencon point is formed by two threads to a pillar, with octagonal and square meshes, alternately. Gold lace is formed by covering yellow silk threads with flattened gold wire, which is then woven into lace or cloth. Gold may be placed on the thread less in thickness than the three hundred and fifty thousandth part of an inch, in so perfect a manner that the most admirable microscope will not show any break or imperfection in it.

FURS,

As articles of dress have always been very highly esteemed in northern countries on account of their warmth. In England they are employed to ornament people of rank, such as the nobles, judges, and even the sovereign is sometimes decorated with ermine. The Poles, Persians, Russians, and Turks, all inherit from their progenitors an attachment to fur clothing. Even in Egypt and Syria, and in the hot climates of Independent Tartary and Bucharia, there is a great demand for furs, without the least necessity for them. Ermine fur is the most valuable known. During summer this animal, which is about fourteen inches long, has a brown fur. In winter it becomes perfectly white, with the exception of the tip end of the tail, which always remains black. The next fur most highly prized, is the black sable, which is found in Asiatic Russia; then the weasel, marten, fox, etc.

SHOES AND BOOTS

Come next in order, and I will make a few remarks on their history, and leave the society to discuss their merits more fully. They were, no doubt, worn during the earliest civilisation of man. Shoes worn by the ancient Egyptians, Romans, and Greeks, may be seen in the British Museum, made of matting, the bark of papyrus, leather, and sundry other materials. In the reign of Edward IV., shoes were made quite sharp at the toes, and turned up and fastened to the knee by a chain. Then they were made round at the toes and ornamented. In the time of Charles I. the toes were perfectly square, and the boots came half way up to the knee, with wide tops turned down. In those days they were not blackened.

Among various nations in olden times, the shoe consisted of a sole tied under the foot; with us the portion which covers the foot is called the vamp, the lower portion the sole and the welt. Though many kinds of leather are used for shoes and boots, those from the skin of the calf will keep out water and wear the best. Dress shoes are manufactured from the skins of dogs, seals, horses, goats, &c. Doeskin, likewise, makes an elastic shoe, but requires some water-proof process to enable it to keep the feet dry.

There are but very few articles used by man as dress, that fashion makes more changes in than shoes. The shoemaker invariably makes the foot conform to the shoe, instead of the shoe to the foot. This may easily be proved by any man in this room, who, if he will take the trouble to examine his toes to-night, will find the little toe bent under the rest, and each more or less indented and crooked—whereas they should be perfectly straight, and capable of being moved about with the same facility that the fingers move. To avoid this, have a plaster cast taken of each foot, and lasts made from them, and then, if you walk properly, you will have great comfort. Invariably raise the heel before you lift the foot from the earth, and it will form the motion of a rolling wheel, and the muscles in the calf of the leg will support the weight of the body, on the fore part of the foot, as intended by nature. If thick soles are worn, as is usual, they will not yield to the bending of the foot, and, consequently, the whole must be raised at once, the muscles in the calf, for the want of use, soon dwindle away, which accounts for the spindling legs we so often meet in our travels. If you go in the country, you will find a great number of farmers possessing fine, robust forms, with well-developed muscular arms, and wretched lank legs, devoid of muscle or flesh. The feet of these men are invariably covered with thick-soled boots, that are incapable of yielding to the spring of the foot. The finest legs in the world are found among the Parisians—this is easily accounted for: their streets were formerly devoid of sidewalks, and paved as ours are, with cobble stones; they are, consequently, obliged to raise the heel first, and walk much on tip-toe, particularly during wet weather, and the result is a well-formed muscular calf that fairly challenges the world for beauty.

GLOVES

Are made of various materials, such as thread, silk, leather, cotton, worsted, woollen, fur, &c. They should be strong, warm in winter, cool in summer, and elastic. Those manufactnred from leather are of many kinds. Kid is, probably, the most beautiful, elastic, and soft material used; it can be dyed of any desired color. The most superior are manufactured in France, from goat-skins imported from Tuscany and Switzerland. Skins taken from unborn calves make gloves of extraordinary beauty and fineness. It was once the custom in Ireland to slaughter cows in calf, for the purpose of obtaining the skins for that use, and Limerick gloves became celebrated the world over. Beaver gloves are much used. Woodstock gloves have been celebrated since the days of Queen Elizabeth—of these the buckskin gloves are probably the strongest. An inferior kind is made of lambskin at the same place, which will not wash. Doeskins come next; both may be washed when soiled.

Gloves were much worn by the ancients. Xenophon says they were fashionable among the early Persians; and Varro, that they were used by the Romans. Among the ancient Christians, they became a part of monastic costume. Princes wore them as a mark of investiture. From an early period until after the reign of Elizabeth, if a person desired to challenge another, he threw down his glove—and if taken up, the challenge was accepted. The last time this ceremony was performed, was at the coronation of George IV., when his champion rushed into Westminster Hall and threw down his glove, at the same time challenging any one to fight who disputed the right of George to the crown.

Machines have been invented for sewing leather and other gloves, which reduce the price considerably. Gloves made of linen or cotton thread, are much used for summer wear, and wash well.

Cotton gloves may be colored to suit the taste, are very strong, and sell for a lower price than those made of any other material. The French make gloves of silk that are very beautiful, and worn by the fair sex. Worsted gloves, woven in the loom, are very warm, and much used in winter.

STOCKINGS.

Before the reign of Henry VII. knitted stockings were unknown. In 1560, Mrs. Montague knitted a pair of black silk hose for Queen Elizabeth, who declared they were fine, delicate, and pleasant to the feet, and that she would never wear cloth stockings again. In 1589, Mr. William Lee invented a machine for weaving hose; and as Queen Elizabeth, the patroness of art, was then in her decline, and James did not consider it an important matter, Lee went to France and settled at Rouen, where he was received by the inhabitants at first, but proscribed as a Protestant at last, and died of secret grief. Some of his workmen escaped to England; restored the invention, and enabled her manufacturers to export silk stockings even to Italy for a number of years, in immense quantities. In 1730, the tradesmen in Naples, when they wished to recommend their silk stockings, declared they were manufactured in England. In 1758, a machine for making ribbed stockings was invented by Strutt, of Derby; and Arkwright's spinning-machine was applied to manufacturing cotton for stockings. In 1845, a single factory at Beecher, near Derby, England, turned off 100,000 dozen.

Stocking knitting or weaving is a perfectly distinct art from cloth-weaving—the manner of combining the thread is different. In stocking weaving the whole piece consists of one thread, whereas there are two threads used in cloth. The woof and warp stocking-loom has not entirely superseded knitting needles, and I hope it never may, as knitting by hand, though certainly not so beautiful to the eye, is far more durable for wear. Besides, it furnishes occupation to elderly people who would find it difficult to occupy themselves as pleasantly otherwise. In the Pyrenees and Valley of Carrol, they knit more than 35,000 pairs of woollen hose annually, and the government will not allow machines to be erected there, for fear of injuring the employment of the inhabitants.

SHIRTS.

Little can be said about these useful garments, they are made of linen, cotton—striped, checked and plain. Some have bosoms of lawn and other fine materials, according to the taste and means of the wearer.

STOCKS AND HANDKERCHIEFS FOR THE NECK

Are made of numerous materials; those manufactured from the silk obtained from a large mussel, known as the Pinna marina, found in quantities on the Mediterranean coast, are, probably, the best. The Pinna attaches itself strongly to the rocks with long silken threads, which are collected and wrought into a silken fabric of extreme fineness, which protects the parts of the neck covered with it from heat and cold—it is an imperfect conductor of electricity and heat. Common silk possesses a similar quality. It is of an imperishable nature—resists putrefaction when buried—is capable of giving out electricity when rubbed; the electricity of a silk handkerchief, when taken off the neck, has often excited surprise by giving off sparks of electricity; and, therefore, no other material than silk should be worn around the neck. A few years since a clergyman complained to me that he was a great sufferer from bronchial affections. I asked him what he had usually worn around his neck, and he replied, white cotton neck-cloths. I said to him, that is the reason why not only you, but nearly all clergymen, suffer from bronchitis. Wear silk neck-ties instead of cotton, and few of your fraternity will find it necessary to call upon your congregations to send you to Europe. The gentleman adopted white silk neckhandkerchiefs, and became, in a short time, entirely cured of bronchitis. And if all clergymen would wear silk instead of cotton, I am convinced bronchial affections would be as rare among them as they are among the lawyers. The reason I think is, that cotton, when shorn of its fibres, is not a bad conductor of heat, and, consequently, when placed around our necks, robs us of it constantly; besides, it attracts dampness far more readily than silk, and while damp, is prejudicial to health; it further requires far more airing than it usually gets after washing. It is now much worn next to the skin, instead of flannel—but never will be found a succedaneum for it.

Mr. Fisher, as an artist, had examined most of the works of art in Florence, in the Vatican, and in the British Museum; and had carefully studied the costumes of different centuries. About the 15th century the neck was not clothed—one portrait, by Titian, which he recollected, had the neck covered much as in the present fashion—in the time of Elizabeth both ladies and gentlemen wore ruffs about the neck, which were, in some instances, so exaggerated that the back part could be seen over the head; they, however, were worn, probably, for ornament rather than service. His impression was, that in the middle ages, the neck was not covered—nor till within a few centuries of the present day. In several ancient works of art, Mr. Fisher had seen a head represented as swathed by a continuous piece of cloth, which was wound round the neck also. These heads, probably, represent priests. The custom of wrapping up the neck, generally adopted, seems to be, however, of quite recent date.

Mr. Garbanati wished we could in this discussion, get out of the mere historical, and into the practical subject—the materials; their qualities, prices, statistics—the machinery, the processes, and the results of the clothing manufactures. These would be more consistent with the character of the club.

He then mentioned his own experience as proving that a slight covering for the neck was better than a heavy one—while he had his neck wrapped up, something was always wrong with the respiratory organs; now that he covers his neck but slightly, he is not troubled with such affections. As a further proof, females do not cover their necks so much as males, and yet, they are less subject to sore throat, &c.

Prof. Renwick, being called upon by the chairman, stated that he had not been aware of the subject to be discussed, and had made no preparation. The hint of the accomplished artist (Mr. Fisher) who preceded him, had, however, reminded him that he also had studied pictures, and could, therefore, draw upon his memory for some facts derived from the inspection of the works of painters.

In all cases, he was of opinion, that there had been a close connection between the style in which the beard was worn, and the amount of covering provided artificially for the neck. The neck being bare or scantily clothed when the beard was worn long; but when the throat was stripped of its natural covering, it was necessary to muffle it.

The oldest portrait that occurred to him, was that of one of the great

Italian triumvirate (Boccacio, he believed), in which the chin appeared closely shaven, and the neck muffled.

What was the character of such muffling might be guessed from forms of dress, which had come down either wholly unaltered, or partially changed to the present day.

Of the first class were the cowls of monks, which are still to be seen in processions in the Austrian dominions: Of the second, the gowns and hoods of collegiate bodies, and particularly at the Universities of Oxford and Cambridge.

When in full robes, the hood was omitted, but in the dress of judges its use was supplied by the tippet.

Authentic portraits, however, were not numerous before the reign of Henry VIII., of England. That monarch, and his cotemporary, Francis I., of France, wore full but short beards. The neck had no distinct covering except the narrow band in which the shirt terminated. In the reign of Queen Elizabeth, the whiskers were cut away and the beard trimmed to a point. This lay upon a triple ruff of cambric, often edged with lace, which hid but did not exclude air from the neck. The same fashion continued during the reign of her Scottish successor.

Charles I., wore mustachios and imperial only. The collar of the *doublet* was high, and over it fell a *band* of lace, of the form so familiar in portraits by Van Dyke, as to be called by his name.

This rich neck garniture continued to be distinctive of the cavaliers until the end of the civil war. The Puritans, on the other hand, wore, first, *bands* of linen, but during the progress of the war adopted the *cravat*. This was a folded kerchief of all finenesses, up to cambric. It was tied in front and the ends fell over the vest.

Charles I., at his restoration, brought back the band in name, but not in figure, for it now had two square ends, which rested on the doublet. This fashion, strange as the statement may seem, is still continued in the *bands* which clergymen of many denominations wear in canonical costume.

Louis XIV., of France, came to the throne an infant, and assumed the reins of government at the age of eighteen years. His beard had not made its appearance, and his hair hung in ringlets on his shoulders. His courtiers, to liken themselves to their sovereign, shaved their beards close and put on *full bottomed* wigs.

Now began the fashion of close shaving, which for nearly two hundred years has been considered the distinction of civilized man.

The neck being bared of its natural cover, the cravat came into fashion, the ends of the kerchief being formed of lace.

When the French were surprised at Steinkirk, by William III., their rich cravats were thrown hastily around their necks, and the imitation of this "much admired disorder" gave rise to a style of wearing them known by the name of the battle. It is a curious illustration of the force of fashion, and of the sway exercised through it by the French court, that the most complete specimens of the full-bottomed wig and the Steinkirk cravat, are to be found in the latest portraits of William of Orange, the constant opponent of Louis XIV., and the loser of that battle.

Cravats, in various forms, did not go out of fashion until about thirty years since, and may still be seen occasionally.

The *stock*, however, a band fashioned of cambric and fastened behind the neck by a buckle, was occasionally worn, late in the reign of George II., and for the first twenty years of that of his successor. The son of the latter, however, afterwards George IV., having, it is said, unsightly scars on his neck, introduced, in order to hide them, a most preposterous addition to the cravat. This was a species of mattrass, formed of silk, padded with cotton, of sufficient breadth to reach from the breast to the lower lip. This was enveloped in cambric and tied by it around the neck.

Philip of Orleans (*Egalite*), while in disgrace at the court of France, resided for a time in England, whence he carried this fashion, with other proofs of "*Anglo-manie*" into France. Among these was the cut away coat, such as is now worn in full dress, in lieu of the old court garment. This coat, with long and narrow tails, with the padding-lined cravat, became the distinctive dress of the opponents of the royal authority, at the breaking out of the revolution. They were worn by the *incroyables* up to the time of the Consulate, when more rational forms of neck covering began to prevail.

The cravat was still stiffened by a light frame, which, however, did not raise it beyond the chin, until Beau Brummel found out that "starch was the thing."

This brilliant discovery had but a short lived influence, for it was speedily superseded by the black stock.

The substitution of a black for a white material for the covering of the neck, is borrowed from the French military men. They, during the wars of the revolution, discarded many of the fopperies of dress, and in imitation of them, the whole student-world of Paris wore black silk cravats as early as 1816. Leather stocks were worn by private soldiers as early as 1800, both in French and English armies. Officers wore cravats of black silk, but Napoleon himself, and his great opponent, the Duke of Wellington, wore white cambric to the latest period of their lives.

The first black satin stock ever seen in New York, was sent to me from Paris, by my brother-in-law, Henry Brevoort, about the year 1828. It was several months before I ventured to put it on, and several years before it was worn in full dress. It finally prevailed, even among the clergy, and I have heard that a right reverend prelate had trouble in bringing back some of his presbyters to the orthodox white tie.

Dr. Stevens.—The most natural covering for the neck is that which nature provides. The peculiar dermal structure of the face, which enables it to withstand atmospheric changes, is continued down on the neck, and enables it, to some extent, to endure the action of the atmosphere. This is seen in the thickening of the tissues immediately under the skin, and in the peculiar arrangement of the nerves; a somewhat similar dermal structure pervades the palm of the hand and the sole of the foot. In consequence of this structure of the face, if the whole body were kept covered, and then suddenly exposed to the weather, the face would resist the action of the weather better than the other parts of the body.

The habit of shaving with hot water was the principal cause of colds amongst men. It necessitated the muffling up of the neck. My own experience is conclusive on this matter. I have, for whole winters, been speechless, owing to colds caught about the neck; but since I allowed my beard to grow, and have not muffled up my neck, I have had the use of my voice as perfectly as at present.

The muffler was put out of fashion by Brummel, who introduced the use of cravats, stiffened with starch, in lieu of mufflers.

Women are not less liable to bronchial diseases than those men who wear their beards. We have got rid of some of the diseases of the respiratory organs; but we have increased others. There is more pneumonia and true bronchitis now than formerly.

With regard to the feet, the covering for them should be of leather, not of India-rubber or gutta-percha, and the leather should not be too thick. The shoes should be greased or oiled in wet weather, but not in dry.

Invalids who wear India-rubber, have chronic diseases, induced through the great sympathy between the dermal structure of the feet and the viscera. Persons with moist feet ought to wear cotton stockings; those with dry feet, woollen.

The Chairman inquired whether any one present could speak on the subject of the dress worn by the Crusaders?

Professor Renwick thereupon said that the Crusaders lasted for a couple of centuries, and that the form of defensive armor, the only dress visible on tombs, had varied. For the greater part of the time, however, the main article of armor was the hauberk, a coat or shirt of linked rings of steel. This was provided with a hood of the same material, and when the hood was drawn over the head, it afforded a defence for the neck. The head, as the most vulnerable, was covered with a cap of steel, the helm or helmet.

About the time of Richard I., this helmet had the shape of a cylinder, or rather a barrel—whence probably the name *casque*.

The Chairman then inquired whether any one present could state whether in the Greek armor any provision was made for defending the neck?

Professor Renwick remarked that it was more than fifty years since he had read the description of the armor of Agamemnon in Xth book of the Iliad. He thought, however, that there was no description of a covering for the neck as adapted to the cuirass. The shape of the Greek helmet, however, rendered such adaptation of little necessity. The Greek helmet could either be drawn over the face, leaving beneath a nose-piece an opening for the eyes and mouth; or it could be thrown upon the back of the head. In the latter position it is to be seen in the busts of Minerva, whether in marble or cut into intaglios.

Mr. Seeley made some interesting remarks on the changes through which articles of clothing go—showing that no material is lost. The garment too much worn for one man becomes the covering of another; and after serving his turn, it is again worked over with new material, to make its appearance in the texture of some fashionable dress, to go the same round until no longer fit for yarn, when, if of wool, it forms a material for felt—if of linen or cotton, it is worked into paper; and when it has done all these duties, it can, by the skill of the chemist, be resolved into valuable preparations in use in many of the arts.

The progress of civilization is strongly marked by the division of labor introduced into clothing manufacture. The old farmers used to make all their own wearing apparel—spin, knit, weave; make hats, shoes, &c. Now we can buy all our clothing ready-made, of excellent quality and good fit. In this matter, the sewing-machine has done what the steam-engine has accomplished in other branches of manufacture.

In the city of Newark there are establishments which keep twelve cutters constantly busy, to supply work for five hundred hands, who, by the aid of the sewing-machine, soon form it into garments.

In the desultory remarks which followed, Dr. Stevens gave the opinion that no covering should be used next to the skin which did not tend to keep it in a well lubricated condition, and that daily bathing was injurious, man not being furnished with fur or aquatic feathers to fit him for such a habit; that some persons require silk, some cotton, others woollen dresses, according to their constitution; that dress is absolutely necessary for man, independently of climatic influences, and that from personal observation in Brazil and elsewhere, he was led to believe that the North American Indian was the finest type of aborigine in the world, and yet he has always been clad in skins, furs, &c.

When parties are afflicted with dermal rheumatism, the skin is loose, and tight-knitted fabrics then becomes necessary as articles of inside clothing. In speaking of drafts, the Doctor stated that our sensation of cold does not always proceed from want of clothing; when in a temperature of 70° we feel the cold, it is due to some unhealthy action in ourselves—some organs are diseased in every one—there is hardly one perfectly healthy man in the world.

The Chairman remarked the mighty change in the cost of clothing as well as of fuel which has taken place in thirty-six years. Thirty-six years since he had to pay $250 for fuel for a two-story house; now, for a three-story one, an equally efficient supply is furnished for $100. These economies have greatly enlarged the commonwealth; and there is no doubt but that good clothing has great moral influence on the individual as well as the community. Those who are properly dressed, are proud of their dress, and keep themselves cleanly. Dress is a standard of civilization. English statistics show that those who are cleanly, live on an average 45 years; the uncleanly live only 16 or 17 years.

The social effects of large factories of clothing, or, indeed, of any large factories, is not understood. They tend to raise a manufacturing aristocracy among us. So with commercial monopolies—the dry-goods importing of New York is now in fewer hands than it was twenty years ago, though the trade is vastly larger. When we have machinery substituted, almost entirely for hand labor, there must be a centralization of manufactures and a consequent immense influence in the hands of a few.

Professor Mason remarked upon the natural indolence of man. Were it not for the vicissitudes of season, we would have no civilization. Never has a truly civilized nation arisen within the tropics. It is a momentous question of the present day to determine whether man, the civilized and enlightened being of temperate latitudes, can maintain his rank, and not deteriorate in physical constitution and in moral worth within the torrid zone. How is labor to be found, where the climate conduces with man's natural indolence to produce listless inactivity, where we want the fervid energy of Anglo-Saxon civilization? This is a truly important question for us, as scientific men and philosophers—to be considered calmly, and apart from the turmoil of political strife.

After some further discussion, the subject for the next evening was chosen, viz: "Governors for Steam Engines," a paper to be read by Mr. Porter.

The Association then adjourned.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE, *December* 22, 1859.

Prof. Mason, Chairman. Mr. John Johnson, Secretary pro tem.

SMOKELESS COAL-BURNING IN LOCOMOTIVE ENGINES.

[London Artizan, Nov., 1859.]

Extracts by H. Meigs.—Coal, as a substitute for coke in them, is felt to be not only a commercial necessity for reduction of expenditure, but perfectly practicable as a mechanical problem, in conformity with the acts of Parliament, that *railway engines shall consume their own smoke.*

The means of doing so, to be adaptable to a locomotive engine, must be simple in design, facile of application to existing locomotives, easy to manage, easy to maintain, efficient in promoting the combustion of coal, *without smoke, to keep up steam, and save expense.*

These desirable qualities belong to the system of smoke prevention. The whole apparatus is exterior to the fire-box, and, therefore, not exposed to heat, and is controlled in the most perfect manner by a single stop-cock. Air is admitted, above the fuel, by one or more rows of tubes, inserted through the walls of the fire-box, and jets of steam are projected through the air tubes from nozzles, one-sixteenth of an inch in diameter, in small steam pipes outside the fire-box, to increase the quantity and force of the air admitted above the fuel, in order to consume the smoke. The jets of steam are used principally when the engine is standing, with the aid of a light draft from a ring jet in the chimney, to carry off the products of combustion, and these may be shut off when not required. The supply of air through the tubes may also be regulated by dampers. The grate bars are placed close together, with narrow air spaces, and the ash-pan and the damper are tightly fitted. The level of the fuel should always be below the air tubes.

This system is now at work with entire success, on the locomotives of the Great North of Scotland Railway, at Aberdeen, and also, daily, on several of the (among others) engines on the lines of the North London Railway, where, as a metropolitan line, the regulations against *smoke nuisance* are rigidly enforced.

It requires a *less weight of coal* than the engines formerly did of *coke, to do the same duty*, and thus *saves the whole difference in the cost of the fuel.* The locomotive engine has been variously cut up in order to suit the views of designers for this smokeless combustion. In the plan before us, the original type of engine, promulgated by Mr. Stephenson, and at this day universally adopted and unsurpassed, is preserved intact; and the locomotive is thus rendered a complete and perfect machine, and entirely meets the great railway necessity of the day, viz., the perfect combustion of coal in railway engines.

Some members were invited to attend at the Great North of Scotland Railway to examine the facts. The locomotive superintendent, Mr. Cowan, received them on a trip of perfect success. The smoke was most effectually got rid of, by simply opening the valves and acting Mr. Clark's ingenious apparatus. It was shut off from time to time, when voluminous discharges of smoke testified to its value. Mr. Cowan stated that he had had the plan working for several months, and its action was sure, and was a saving of fuel.

PROGRESS OF STEAM NAVIGATION AT HULL.

Hull has been noted, for many generations, for its Greenland and Davis' Straits fishery. At one time over sixty large ships, with each a crew of thirty to forty men, representing a capital of £700,000 sterling. In 1816, 63 ships brought home 5,817 tons of oil. In 1820, England and Scotland brought home 18,725 tons of oil.

Steam vessels are now introduced. The old wooden vessels have been fitted with screws as auxiliary power; and recently *iron vessels.* The latter have proved almost a total failure, being bruised, rent among ice, and hard to keep from sinking. And it is a question whether the intense cold of the Arctic is not dangerous, rendering the iron brittle.

Note.—Messrs. Renwick & Leonard remark, that iron grows stronger as its temperature rises from 32° to a dark heat.

CHEAP STEAM ENGINES.

The rapidly extending use of steam engines has already produced serious evils, especially in those for agricultural purposes. They are made by ignorant makers, and cause numerous fatal accidents. They are made extensively in Great Britain for exportation. None should be allowed except such as are made under the superintendence of duly qualified engineers. Those otherwise made ought to be broken up.

THE GREAT EASTERN.

It has been supposed that Brunel originated that ship. That is a mistake, for he neither created nor originated her. She was designed and built by Scott Russel, yet neither has he the credit of having originated her.

Mr. Fisher stated that an American engineer, who had recently returned from Europe, had secured an interest in "Clark's Coal-burning Locomotive," and that one was now being built at the Roger's Locomotive Works, Paterson, New Jersey. He further stated that this locomotive was thoroughly successful, and, from its great economy, was likely to be brought into general use.

Messrs. Broughton & Lindsey, of Pennsylvania, being requested to exhibit their invention, came forward and described, by the aid of a beautiful brass working model, their device for converting a continuous rotary into an alternating rectilineal motion. The use of this apparatus is to carry the bed-plate of a planing, stone-grinding, or stone-polishing machine, or that of a printing press, backward and forward, with a uniform, regular motion, in either direction; and, if desired, with a slow motion in one direction, and a quick motion in the other, or with the same rate of speed in both directions.

There was also exhibited a machine for quarrying slate, marble and other stones. It is intended to plane grooves around the block, and so cut it out.

Mr. Butler remarked, that if it would work efficiently it would be very valuable; that a friend had told him of blocks of copper being found so large that they could not be got rid of; cutting with chisels being in such cases impracticable.

A gentleman from Minnesota exhibited a model and drawings of a patent process for saving all the latent heat of steam, which it has to part with in condensing. This did not seem to the members to be a very important invention.

Mr. Churchill exhibited a small apparatus, designed to show the effect of "percussive ebullition." The exact theory of the operation and the application of the apparatus were not stated.

Mr. Samuel Broad exhibited a model of a life-raft, designed for easy stowage. The platform was of canvass, strengthened by strong twine network; this was distended by means of slight poles, and the whole was buoyed by means of India-rubber air tubes under the platform. This was highly commended by several members as a light, portable and easily-stowed raft.

In continuation of the subject of last evening, the following paper was read by S. D. Tillman, Esq.

The works of artisans separated from us by long intervals of time are invested with a peculiar charm. Seen through the hazy light of antiquity, not only are defects unobserved, but new beauties and uses are discovered. Thus we ascribe to others in the dim distance, the creations of our own fancy, as we sometimes do in dreams. But closer inspection and more careful investigation will bring to view the real proportions and practical value of many articles which were in common use in the classic ages. The remark will apply to those of most importance, embraced under the general term of CLOTHING. The painter and sculptor are often eloquent in their praises of the grace and beauty of the ancient wearing apparel, but the simple truth should be stated, that in respect to their actual value as garments, there is but little difference between the tunic, toga, and sandal of the ancients, and the blanket and moccasin of the American Indian. A kind of shoe, inferior to the moccasin, was known to the ancients, but was not in common use.

The sandal and the shoe may be appropriately taken as symbols representing the state of the useful arts among the ancients and moderns. The arts of the former furnished scanty supplies to the demands of absolute necessity, and were constantly reproduced in the same old mould of custom. The latter having completely satisfied the actual wants of man, are now surrounding him with comforts, conveniences, and luxuries in such profusion as to exceed his most extravagant desires, and although apparently complete they seem to be steadily approximating toward a higher point of perfection.

The sandal was only a partial covering for that part of the foot which man, as a traveling animal, soon found it absolutely essential to defend. The more common variety did not protect the toes, and we may infer that grave men and matrons, in those far-off ages, were often afflicted with bruises on their pedal extremities, the pain of which our modern boys who have played barefooted on a summer's day, can fully appreciate. The sandal did not guard the foot against filth, but rather became a receptacle for it. Hence arose the necessity of frequently washing the feet. Another serious objection to the sandal is, it will not prevent the foot from expanding into uncomely shapes. All these defects are fully remedied in the modern shoe and boot. They protect the foot from cold, dampness, and dirt, and yet allow its natural perspiration to escape. They preserve the natural form of the foot, and often tend to make it more symmetrical.

The best material for the boot and shoe is, without doubt, leather; being manufactured from the natural covering of animals, it is porous, but impervious; strong, yet pliant. The preparations known as leather are of two kinds, which differ widely in their composition, the tawed and the tanned. The first named was probably used by the ancients, and we find no evidence, either in history or among relics, that the use of tannic acid was understood, and we may naturally infer that "Simon, the tanner, whose house was by the sea-side," alluded to in the New Testament, and all those of his class, were artisans who practiced a kind of taxidermy, by which the skins of animals were merely preserved.

The manner in which the Indian of the American continent prepares buckskin was probably the primitive mode, and is the basis of all tawed preparations. The deer-skin, after the hair is removed, is covered carefully with a preparation consisting of a mixture of deer's brains with ley made from wood ashes, forming a kind of soap; it is then thoroughly dried.

This operation is repeated two or three times, after which the skin is placed in a pit dug in the ground and smoked the same way their meat is treated. The principal ingredient used by leather manufacturers in preparing sheepskins is alum. A large number of patents have been taken out for improved processes in tanning; those which are claimed as hastening the process owe their merits to the application of such materials as would be used in tawing, and the product might be called a tawed-tanned leather. The whole number of patents taken out for tanning processes already exceed one hundred. They may be divided into two classes, the chemical and the mechanical.

The art of tanning can be defined, in a single sentence, as a chemical union of the skin of an animal with tannic acid; in other words, leather is a true chemical compound consisting of about fifty-four per cent. of gelatin and forty-six per cent. of tannin. Gluten and tannin in liquid form unite instantaneously. This simple fact was first discovered and proved by Deyeux, a French chemist. Since his time much has been done by chemists to ascertain the amount of tannin contained in various vegetable formations. Long lists are found in several English works, at the head of which stand kino, catechu, and japonica, a preparation from an East Indian vegetable; nut-galls, which are the excrescences found on a dwarf oak in warm countries; oak, sumach, willow, and chestnut. In several of these works no mention is made of hemlock.

On the use of this bark the Hon. Zadoc Pratt, who has tanned more sole leather than any other one man in the world, at the annual dinner of the Hide and Leather Association in February last, said "hemlock is truly an American bark, and that of the Catskills affords more tannin and is better adapted to make sole leather than any other; the farther you go from the Catskill mountains the less tannin you find in the hemlock. When we sent the first hemlock leather to England, John Bull's chemists said it was not tanned, and declared they could bring it back to hide. The mistake was perhaps a natural one, but it was none the less a mistake, for after trying their utmost skill upon it, they were obliged to exclaim that they did not know "what those Yankees' *red* tannin had been doing to it."

Although our American chemists have not fully investigated this subject, principally because our wealthy tanners have not offered to pay them for it, yet Col. Pratt asserts that hemlock contains more tannin than any other bark, and with it millions of sides are tanned every year.

The mechanical improvements in the art of tanning since the Revolution have been so great, they may be said to have made a complete revolution in the whole method. For the principal improvements we are indebted to the genius of one man, and I propose in a short sketch of him to present them in detail.

Col. William Edwards was born in the year 1770, at Elizabethtown, N. J. He was the grandson of the celebrated divine, Dr. Jonathan Edwards. His mother was Rhoda Ogden, an elder sister of Gov. Ogden of New Jersey. His father was a country merchant and an active Whig. William was, therefore, trained amid the stirring events of the American Revolution, and at the early age of fourteen he was placed under the care of his uncle, Col. Mathias Ogden, who, like his ancestors for several generations, was a tanner. In the tan-yard, for several years, William spent his days, while his evenings were devoted to study in the library of his uncle, Gov. Ogden. The tan-yard then consisted of a few oblong wooden vats sunk at the level of the ground. The hides were prepared for tanning by removing the hair, after it had been loosened by means of lime-water; then they were subjected to the bating process, and afterwards placed in the tan-liquor, technically called *ooze*. The bark from which the ooze was made was crushed in a circular trough of wood, about fifteen feet in diameter, around which wheels were rolled by horse-power.

In the year 1790, at the age of nineteen, Edwards removed to Northampton, Mass., and commenced the erection of a tannery on his own account. The selection of this town was not in accordance with his wishes, but as his father had previously removed to Massachusetts, it was deemed advisable to be near him.

He selected a clayey side-hill below a spring of water; his first improvement was to place below his series of vats a wooden trunk connected with each, so that by drawing a wooden plug in one corner of the vat the liquid contents would be discharged into a lower reservoir, now known as the junk. He then placed a series of leaches one above another, and connected the upper one with the junk by means of a suction-pump, so that the spent liquor could be drawn up and discharged into the leach. By means of this arrangement he was enabled to obtain ooze of any desired strength. His beam-house, in which the hides were prepared, was a substantial building, the second story of which was used as a currying-shop, in which the tanned leather was finished and prepared for market.

Some distance from his tannery Col. Edwards erected the first bark-mill ever driven by water power. The first mill was constructed with crushers of stone; some time after an iron bark-mill, invented by Toby, of Hudson, was substituted for the old mill, and is the same substantially now in general use. The success of Edwards was so great that in four years he was enabled to send to Boston the first lot of leather ever received there from his county.

In 1799 his tannery was destroyed by fire, but his friends rallied around him, and advanced the means for the immediate erection of another. He had thus another opportunity of carrying into effect other improvements already contemplated and matured. Knowing that his leather tanned most rapidly in the summer, he determined to try the effect of increased heat.

After various experiments he perfected the copper heater, which was placed within a wooden reservoir, and served to extract the strength of the bark by heat, without discoloring the ooze. This arrangement has been very generally used by tanners since that time.

The importation of dry hides was then rapidly increasing; they had formerly been softened by the stone-wheel; in place of this Col. Edwards erected a hide-mill similar to that used in fulling cloth.

Perceiving the great difference between the rough surface of sole leather as it left the tannery, and its hard smooth surface after it had been under the lap-stone of the shoemaker, he determined to effect that change at the tannery, and the result of his experiments was the rolling mill.

This consists of a brass roller about six or eight inches in length, by four or five inches in diameter, attached to the end of a vibrating pendulum, which was held by a spring a few inches above a bed-plate of the hardest wood, having a curved surface, corresponding to the radius of the pendulum; under this bed-plate, which was three or four feet from the floor, a long lever was placed, so as to be used by the foot of the operator; it was connected with the top of the pendulum by a vertical iron rod. The pendulum was held in guides, so as to vibrate in a right line, and by means of a horizontal connecting rod, was attached to the crank on the top of a vertical shaft driven by water-power. When the side of leather was placed upon the bed-plate, the operator, by means of the lever, brought the vibrating roller down upon the leather with immense pressure; he moved the leather while the roller continued to vibrate, by raising his foot from the lever, and thus the whole side was soon passed over, and rendered harder and smoother than it could possibly be by hand. This form of machine has been in use by the trade more than sixty years. Edwards soon after, in conjunction with others, erected two more tanneries, at Cunningham and Chester, and about the same time he sent an enterprizing young man to act as his agent at New York in the sale of leather, at a salary of $1,000 a year, who soon rose to notice there. He took a prominent rank in the trade, finally acquired a large fortune, and for many years he was the leading leather dealer in the Swamp. This gentleman was the late Gideon Lee, formerly mayor of New York.

In the year 1811 Edwards met with another serious loss by fire, and after various attempts to recover himself, he was finally, in 1815, compelled to assign all his effects for the benefit of creditors. In this emergency he cast about for a new location for a tannery on a still more extended scale. The vast forests of hemlock on the Catskill Mountains, and their proximity to the Hudson River, soon attracted his attention. At once the plan was matured, and with the help of his young friend, Gideon Lee, and another well known leather dealer, Jacob Lorillard, he was enabled to construct at Hunter, Greene county, the most complete tannery, entirely under cover, the world had thus far seen.

To his former improvements he there added the elevator and conveyer, by which the ground bark was delivered by machinery directly into the leaches. In this he followed in the footsteps of the great inventor, Oliver Evans, of Philadelphia, who, just at the close of the revolution, had made the common flour mill automatic.

Thus, amid the grand old woods of Greene county, this eminent man continued his career for many years, happy only in making more perfect a system of tanning, night and day, the year round, by machinery, which as a whole should be called his own.

Edwards was not long in enlisting followers among the mountains that overlook the Hudson, and personally introducing his improvements to the large manufacturers of leather in the interior of our State. I well remember his visit to my father, the late Andrew P. Tillman, who manufactured at Geneva, and had for his market all western New York. The personal appearance of Edwards was striking to me, then a boy of ten; he seemed a giant! this was not surprising, for I have since learned that his actual height was six feet four inches. I was struck with his enthusiasm in describing the practical success of his improvements; his proofs were con vincing in this case, for Mr. Tillman immediately constructed, under his advice, two other large tanneries at Seneca Falls and Port Byron, which were operated by water power, and accomplished all that had been predicted. Soon after, Mr. Graves, at Rochester, and Mr. Palmer, at Buffalo, erected extensive establishments upon the Edwards' system, and at this day similar factories may be numbered by the thousand.

Improvements have been made since Edwards' day in the chemical preparations and manipulations required for skins and lighter kinds of hides. The French for a time seemed to take the lead in this branch of the art, but I am informed that the quick process of George W. Hatch, as well as of several others, produces equally good results. The use of these systems will probably lead to the cultivation of the vegetable japonica in this country as a substitute for the bark of trees, which, as agricultural operations are extended, must eventually disappear.

The most important machine used by curriers in the finishing of leather after it has left the tannery, is the splitting machine. By the old method leather was reduced to the proper thinness by the use of knives having turned edges, which performed the operation of shaving the leather. This task was always severe, and the shavings of the leather were worthless. The principal part of this work is now done rapidly by machinery. The side is reduced to proper thickness by taking off one large shaving, which is afterwards finished in the same manner as the calfskin, and is used in those parts of the boot or shoe where inferior leather may be substituted.

William Bent, of Boston, patented in 1808 a machine which was used to some extent. Phineas Dow, of the same city, patented in 1810 his splitting mill. I am unable to state who was the inventor of the admirable machine now in general use.

Having rapidly traced the progress of improvement in the art of tanning, an appropriate inquiry at this point is, what has been the increase of trade resulting therefrom? The tables of the United States census for 1850 are too far removed, in point of time, to furnish us with an approximate estimate of the trade of 1859; we must wait until the completion of the census of 1860 for such official data as would be required in a general summary. A few statistics, however, will enable us to form an estimate of its general progress. At the commencement of the present century not a single tannery in the State of New York used any other motor than animal power. Our latest returns show 418 tanneries driven by water, and 125 by steam power. In 1810 the number of sides tanned in this State was 151,000; at the present time not less than 4,250,000. In 1845 the value of the product of New York tanneries was $6,500,000, in 1855 it was $15,500,000, showing more than a hundred per cent increase in ten years. It is difficult to form a correct estimate of the number of hides and skins tanned within our whole country, but knowing the facts with regard to our great consumption of meat, we may safely assert that the number of domestic hides manufactured in this country is double that of any other portion of the world containing the same number of inhabitants.

We not only use all the hides produced in this country, but we import largely from abroad. In 1858 the number of hides, and prices, imported was 2,757,000, valued at about $10,000,000. The rate of increase from 1838 to 1858 was about 400 per cent. The value of hides imported exceeds that of any other raw material by several millions. More than one-half of this trade belongs to New York. I am unable to state the amount received at the ports of Boston, Philadelphia, Baltimore and New Orleans, but from partial reports I think I am safe in estimating the increase of importations at each of these cities at 100 per cent for the last ten years. A comparison of the hide trade of the city of New York with that of the largest ports of Europe, proves that the average annual importation at this port exceeds that of any other in the world. The importations of sole leather hides for the last five years at Liverpool averaged 550,000 per annum, at London 475,000, at New York 1,630,000. The latter being 600,000 more than the combined importations of the other two ports.

The number of sides of sole leather alone inspected in this city in 1857 was 3,248,000, for 1858 it has been estimated at three and a-half millions. It must be borne in mind that vast quantities of leather are required for saddle and harness makers, for machine shops and many other branches of art, besides that which demands the greatest portion, the manufacture of boots and shoes.

The statistics of the trade of the single town of Lynn, Mass., for 1857, show that 15,566 persons were employed in the manufacture of boots and shoes, of this number 11,021 were females.

During that year 3,274,873 pairs of boots and 6,000,700 pairs of shoes were made, valued at $4,165,529. The total value of articles in that branch of trade, manufactured in the State of Massachusetts, in 1857, was $37,489,923. The sales of boots and shoes in New York by jobbers exceeds $15,000,000 annually, besides those of some 800 small dealers. From these figures we may infer that in the census of 1860, leather and manufactures connected therewith, will rank second, if not first, in importance among the great branches of the industrial arts of our country.

The value and extent of this trade, the talent and energy it develops, and the wealth it produces, is now so great as to dignify all the common names belonging to it. The time was when the mechanics in the shoe line, dreading the epithets of cobbler and shoemaker, were anxious to be recognized, in their own associations, under the more euphonious title of "cordwainers;" but so many shoemakers have arisen to affluence and fame, who have not forgotten to acknowledge their trade, that the craft now begin to find a new charm in the name. Broadway boasts of its Shoe and Leather Bank, and the trade have a weekly newspaper in this city devoted entirely to their interests, the perusal of which will convince the most skeptical of the vast extent and variety of these interests, and their direct bearing upon the general prosperity of our country. The locality of the leather dealers in this city affords another illustration of the manner in which pleasing associations cluster around the commonest name. What word, in its original meaning, conveys more gloomy impressions than "the Swamp." In the last century it was the most dismal part of Manhattan, but the tanners found it fitted to their use, and there they and the leather trade have remained ever since, like a band of brothers, unaffected by money panics, permanent in their prosperity, until it may truly be said, no business houses in the metropolis have a more *solid* foundation. To be a dealer in "the Swamp" is *prima facie* evidence of stability and integrity. If we seek, however, for first causes of prosperity, we shall find that to the inventor chiefly is trade indebted for its greatest success. Men of energy and industry may be found in every age, but creative minds are not so common. It will no doubt surprise some who hear me, to learn that the prosperity of the shoe trade has turned on a single pivot, and that this pivot was neither more nor less than a common wooden peg.

The use of the peg for fastening the whole sole was patented by Samuel B. Hitchcock and John Bement, of Homer, N. Y., in 1811. Some unsurmounted difficulties prevented them from carrying their invention into general use; these difficulties appeared to have been removed by Joseph Walker, of Hopkinton, Mass., in the year 1818. He demonstrated the superiority of the peg to the waxed thread in fastening the sole to the upper leather; the latter being preferable only when great pliability or thinness of sole is required. I have high authority for stating that seven-eighths of all the shoes and boots now made in this country are pegged.

The first pegging machine was patented by Fred. Bray, of Rawley, Mass., in 1832; another was patented by William B. Randall, of Fayette, Me., soon after. A great number of improvements have since been made. The first patent for making boots and shoes was granted to Peter Gordon, of Philadelphia, in 1791. The first for cutting out soles to Jonathan Hill, of Bellerica, Mass., in 1836. More than fifty patents have been obtained for crimping machines, which give the proper curve to the upper leather. The importance of the shoe-pegging machines to the whole trade induces me to notice more particularly one which is now in successful operation in the city of Boston.

In this machine, which is self-feeding, the pegs are carried along in sheets of uncut wood; as fast as the awl has made a hole, a peg is cut off and set into the top of the hole; it then passes beneath a hammer or plunger which drives in two pegs at once. The awl and plunger are stationary, and have only a vertical motion, and the shoe is moved in the proper direction by means of an iron form of the same size and shape, upon the principle first developed in Blanchard's well-known machine for turning wooden lasts. Soling shoes thus seems the work of magic, for a pair is completed every two minutes.

A sewing-machine is also invented, which makes precisely the same stitch as that made by hand. In this an awl punches a hole in the leather; into this hole needles instead of bristles are passed, having attached to them the common waxed thread; after the needles have passed each other they are seized by nippers which perform the part of fingers and draw the thread to its full length. The prominent peculiarity of this machine is, that the arms bearing the nippers swing through a constantly decreasing arc, corresponding with the decreasing length of the threads. The machine is necessarily expensive, and as yet has not come into general use. Another machine is in operation for cutting out shoe-soles with great rapidity, and still another for giving graceful curves to the heel, horizontally and vertically. This last machine is the invention of H. D. Stover.

Time will not permit me to describe the complete modern arrangement for protecting the foot, which consists of the stocking, the shoe, and the over-shoe. The first is designed more for cleanliness than warmth, and by frequent changes of it we are enabled to keep the same shoes or boots in constant use until they are worn out. The over-shoe may be regarded as the cuticle of the artificial covering. The material most commonly used in its manufacture is India-rubber. The method of preparing it is wholly American, for which we are indebted to Charles Goodyear, Nathaniel Haywood, and Edwin M. Chaffee. These men belong to the class of primary inventors, the secondary class being those who make minor improvements upon the first and original method; and in point of numbers they stand in relation to those of the first as *a thousand to one.*

I regret I am not able to give the names of some of the inventors already alluded to, but they shall be put upon a permanent record, because I regard it as our duty to seek out and rescue from oblivion the names of all great inventors, who have directed us into these new paths of improvement, which may be regarded as *short cuts* for reaching the ends desired by the manufacturer. These are the men who break in upon the routine of custom, and wake the common mind to a new and better way.

The true inventor drops upon the dull world as the pebble upon the stagnant pool. He is the center of a new force, and though like the pebble, he disappears, that force still moves outward in ever-widening circles, bearing upon its waves many a one to wealth and position who has never thought of, nor cared to know the originator of that force, or the prime mover who carried him to the desired haven. Yet the power of the new conception is never lost. Once started, it rolls onward, eternal and sublime, bearing with it many a boon and blessing to mankind. Who can estimate the combined influence of that new race known only to modern times, whose original combinations of forms and movements are making the inanimate powers of nature do our bidding? When the true history of the world shall be written, when causes shall be measured only by the extent and continuity of those effects which elevate man, lighten his burdens, and thus give freer play to the higher powers with which God has endowed him, then shall the true inventor have his appropriate place on the roll of fame; but in any event let us believe that when he passes to another sphere, the power is given him to solve the intricate problem of humanity, to find in it the force and influence of his own individuality, and thus to fully comprehend all the benefits he has conferred upon his race.

Mr. Porter read a very able paper, illustrated by splendid diagrams, in which he developed the laws in accordance with which the governor acts. He treated the subject in a strictly scientific manner, representing the forces in operation by lines, and, in general, giving geometric demonstrations.

In the discussion which followed, the question was raised, Whether water power can be governed as easily as steam power?

Mr. Garvey considered that there was a physical impossibility of governing water with the same perfect ease as steam can be governed. Water is a non-elastic, dense, and heavy fluid, while steam is an elastic, rare, and light fluid; therefore, water cannot be put in motion and be brought to rest with the same ease as steam. It is certain that any kind of power—no matter how irregular or sluggish—can be governed with sufficient regularity for ordinary manufactures, but steam is pre-eminently the power for all uses. It is lively, can be controlled with ease, and be made to act automatically.

Mr. Stetson stated that turbine water-wheels are as easily controlled as any steam-engine; that the defect found in water power relates principally or exclusively to overshot, undershot, and breast wheels, but not to the turbine.

Mr. Dibbin was sorry to find that Silver's marine governor was omitted. It was an admirable invention by an American, who, like many others, had to go to Europe to find patronage and encouragement.

The discussion was abruptly discontinued in consequence of the lateness of the hour.

The subject for next evening was then selected, viz: "Franklinite, its natural history, chemical analysis, practical uses, and mercantile value, etc."

The Chairman was glad to find this subject selected. Franklinite is a peculiarly American production. It is to be found in abundance in New Jersey, and in its commercial importance is second to nothing at present attracting attention. Applied to iron, it hardens the surface, solders laminæ together, renders the stock more tenacious and less liable to corrosion; it enhances the value of railroad iron to such an extent that English companies now buy at $35 a ton any quantity of iron prepared with franklinite.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE,
December 29th, 1859.

Professor Mason, Chairman. John Johnson, Esq., Secretary pro tem.

Mr. Howe read a paper prepared by Mr. Taylor, of Danbury, Conn., on

HATS.

The machine of Mr. Taylor was patented in 1856. It consists of four rollers, a trough and frame, with cavities and chambers, the rollers being fitted with axles and having a shaft in the centre, between them. Motion is communicated by gearing, revolving all one way. There are four hats fitted at one time, and these receive a longitudinal motion as well as a rotary, so that they are passed out at one end of the machine by this means. No two rollers are on the same line. They are concave, about four feet long, four inches diameter at one end, and taper off to about two and one-half inches at the other end. A pressure from 500 lbs. to 1,000 lbs. is required to produce felting. A machine of this kind will turn out about 600 hats per day, and effect a saving in the manufacture of about fifty per cent. It will also felt cloth as well as woollen hats. Pulled wool is better for hats than sheared; and the best qualities of wool are imported from Australia, Africa and South America. Consumers need not fear adulteration with cotton; cotton will not felt or blend with wool, or at least not without being easily detected and palpably injuring the fabric. About 20,000 wool hats are made daily in the United States, and they require 5,000 lbs. of wool for their manufacture. Cloth establishments also consume vast quantities of wool, so that it is worth considering what would be the result if all the wool-bearing animals were to become extinct.

Each hat passes through thirty operations; and it takes thirty men to turn out two hundred dozen a day. The wool is carded upon a core like a hen's egg. The shoddy is made in two parts, but each part makes a hat, containing about two ounces of wool.

After hardening, the hat is shrunk to about one-third of its original size, and for this process sulphuric is found to be the best acid. The wool fibre has a fine beard upon it, which the acid eats away, and removes as well the grease which is found upon the surface of wool.

There is, however, a limit to the extent to which the felting operation can be carried, which limit can only be learned by experience and experimental skill, for each kind of wool shrinks in a manner peculiar to itself.

Professor Mapes said he had never examined the process of felting, but thought that if the fibres could be all interwoven, they would give a very strong fabric. Wool has butts or roots which are liable to be drawn into a mass or lump, and these presented the greatest difficulty to be overcome in the old plan of felting. To avoid the forming of lumps it is necessary to keep every fibre of the wool in motion, until it drops into its place.

In making seamless garments a copper man is formed, and upon him the fabrics are felted. I have seen gloves made in a similar manner, and am inclined to think there is some glutenous substances which unites the fibres one to another in felting. A Mr. Osborne, in 1832, carried on the business of felting, at Burling Slip, and made satisfactory experiments on making seamless coats, which are by no means of such modern date as many suppose, but are, on the contrary, very ancient.

Professor Mason would like to know who invented machines for "pegging" boots and shoes?

Dr. Stevens—It was Mr. Bennet, of Homer, invented pegging for boots, &c., in 1814. The tanning process has been accomplished in a very short time of late. I once had the skin of a lamb tanned while the cook was dressing the flesh, and by the time the cooked meat was eaten, a pair of mittens were made of the leather.

Prof. Mapes.—The English used to take seven years to complete the process of tanning, and the statement that leather had been in the tanning liquid for seven years was a great recommendation for the leather.

The Americans, however, forced the tanning liquor through the hides, and thus accomplished in hours what required months or years in the old way of operating. This is accomplished by wrapping the raw hides round the periphery of a wheel, the interior of which receives the tanning liquor, which is forced through the hides by centrifugal force generated by the rapid rotation of the wheel. He had a hide completely tanned during the exhibition at a fair of the American Institute, several years ago, yet he was refused a patent for the process. In the liquid which passed through the hides during the rotation of the wheel, no trace of tannic acid could be found, which showed that all the tannic acid of the liquor had been absorbed by the hides; consequently they were tanned in minutes instead of months.

Chairman.—The main object at every step of our progress in science should be to reduce our knowledge to practice, and to simplify means of operating in the arts. We are forcing our civilization toward the tropics, in order that they may return their products to us and become civilized by the use of our manufactures and by intercourse with us.

Certain men of New Haven have introduced civilization among the inhabitants of Africa, where it would otherwise have taken ages to make its way. One man by the introduction of the cotton gin, the other by the trade in India-rubber.

FRANKLINITE ORE.

Prof. Mapes introduced the subject of the evening—a substance which yields both iron and zinc. It has some very peculiar properties, and Mr Selleck has devoted much time to render it practically useful, although it has been neglected by others. The iron from it is not good for puddling. Analyses of it differ, so that it cannot be stated distinctly what are its ingredients. It is very hard—harder than any other iron—has a peculiar crystal and fracture, and much force is required to tear it asunder. It melts at a much lower temperature than ordinary pig iron—at a little above ordinary red heat. It will attach itself to ordinary iron, and become a part of the mass—in fact a perfect amalgam. The two so united are too hard for a file to touch, in fact, they are harder than steel. A sheet of iron faced with it cannot be drilled, and is the best material for safes. Bars of franklinite iron make excellent horse-shoes, and the points of ploughs. One common plow requires twelve new points before itself is worn out, but a point of this iron will outlast the plough. Iron mills will not last; a pair of rollers a day have been worn out even in grinding bones; but made of this iron they would wear well. Coat the edge of a shovel with it and it will outwear the body.

Melting at so low a temperature it is good for coating softer iron. The zinc from the ore yields a valuable white oxyde. The iron itself oxydizes slowly, and is therefore a valuable substitute for the noble metals.

When gold pens were first invented iridium and rhodium were used to point them, but those metals are scarce. They then made an alloy of zinc and platinum, which was heated to white heat in hollows of charcoal, until a sort of explosion took place, and pellicles of metal were driven off, which were then collected and afterward used as points for pens, and were found to be the hardest substance known. They would not wear out. Different metals combined give new alloys, some of which become only harder not heavier. These are found useful for various purposes.

Agricultural implements ought to be made to last as long as possible. The parts in contact with the soil should be hard.

Mr. Wetherall.—The peculiarity of the franklinite is, that it is an alloy of iron, zinc, and manganese.

Dr. Deck showed some specimens. The only locality where it is found in quantities suited for practical purposes, is Sussex Co., N. J. There was a little found in the Isle of Skye, but is was only regarded as a natural curiosity. He had made an analysis, and found it to consist of 3½ parts zinc, 4½ manganese, and the balance iron. Its crystals were similar to those of spelter. He had melted the specimen of iron shown, in a common stove, at 1,850 degs. of heat.

Mr. Garbanati had noticed one peculiarity of the specimens exhibited, which, if a general characteristic, renders franklinite of the utmost value for a purpose not noticed by preceding speakers. It is not subject to the influence of the magnet, and is therefore of the utmost value in ship building. The influence of the magnet on iron ships has been a difficulty which builders have not been able to overcome, and consequently there has been a vast destruction of life and property. If, then, this iron can be used successfully in avoidance of that trouble, it will prove of more value for that purpose, than for all other purposes together.

Chairman.--Mr. Smith has informed me it is likely to be of the utmost value for the wheels of railroad cars, and even for the rails; he expected it would give a good 'bite' to the rails. The single article of frogs would give employment to all the furnaces in use, should this iron be found desirable.

Col. Curtis.—Both wheels and rails might be coated with it. The stubs or ends of the rails wore out very quickly by the wheels rubbing against them, if those 'stubs' were coated even for a few inches, it would save millions of dollars.

Mr. Seeley had examined the ore as a chemist. It had been long known, and was by no means new. Scientific men generally examine and analyze everything found out or suggested; and though they do not always state their value, nor seek profit, they keep printed records of the facts. He had seen about six analysis of the iron, and they were almost all alike. It is a definite compound of iron, zinc, and manganese—the proportion of oxyde of iron 66, the other metals about 17 each. It was a very pure iron, but the zinc carried away much heat, so that it was found more profitable to work it as a zinc ore. Zinc is a volatile metal. The franklinite, when used as an iron ore, evaporates its zinc. He considered it had no other metallic element than manganese; it has no sulphur. It is a very hard iron, but scarcely as hard as stated; its most valuable quality was its uniting with cast and other iron. He thought the zinc accidental to it. It was just the right iron to make steel of; but it is not harder than steel, with the same brittleness. With a file the same impression could be made on either. It would not answer for cutting glass, as had been stated, though it would scratch it. There are bits of steel sold for this purpose for a few cents, which cut glass in the same manner. The franklinite is brittle; it varies with the amalgam in it. A complete account of the ore is published in Leslie's book. Mr. S. thought Dr. Deck mistaken in regard to its fusibility at a low heat. He gets a very high heat from a cylinder stove, sufficient to melt silver in it often.

Mr. Wetherall.—Most of the books give an analysis, but not of the true franklinite ore. Mr. Trumbull, of Jersey City, uses about 60 tons per week; he gets about 26 or 27 per cent oxyde of zinc.

At this point the Association accepted an invitation to witness the experiments of Dr. Vanderweyde. Dr. V. had found some curious electrical properties, some of which he explained, as he could not at the time show in quantities large enough for the occasion. He stated that a piece of franklinite iron, suspended with platina, had remained in nitric acid for 12 hours without being acted upon. The doctor then showed that franklinite iron is almost free from magnetic influence; and gave an interesting account of the properties of manganese, in explanation of the properties of iron charged with it in connection with the battery. He also tried an experiment with a piece of franklinite iron, in the place of platinum in the battery cup. The peculiarity appeared to be, according to Dr. V., that franklinite, in place of platinum, gave more power as a motor than as a combustible agent.

Mr. Seeley showed a solution of iron which was free from sediment, and which contained five per cent of carbon. Mr. S. asked, "is manganese a part of steel?" He thought it was oxydized and separated.

The Chairman thought the material not well understood; there is much to learn on the subject.

Dr. Vanderweyde.—It is important to know if it is a chemical combination or a mere state of crystalization.

Dr. Deck.—The zinc cannot be drawn from it by heat. He would make further experiments.

Mr. Sellcck had made as good steel from it as he had ever seen, and had made knives, razors, etc., from it. Mr. Gilbert had informed the President that he had been able to drive out this zinc by heat.

Mr. Seeley.—The French have a metre for trying the adhesive power; and had found franklinite iron 40.8 to the square inch—other iron 40; and in answer to a question of the Chairman named several books in which the whole particulars had been published.

The Chairman stated it had been proven that franklinite had a tenacity over fifty per cent greater than other iron.

AMERICAN INSTITUTE, POLYTECHNIC ASSOCIATION,
January 6th, 1860.

Prof. Mason, Chairman. John Johnson, Esq., Secretary pro tem.

During the hour for miscellaneous business, Mr. Garvey gave a brief description of an instrument called a "Horizostat," for obtaining a horizon at sea under all circumstances. It depends for its action upon the tendency of a rotating disc to maintain the plane of rotation. After describing it, Mr. Garvey alluded to the fact of the government of Russia now employing this invention for the purpose of obtaining a fixed plane to make observations from, and the papers which mention the fact, describe the invention as made by Piazzi Smyth, of England, whereas he (Mr. G.) had described his invention, and made a model, long before Smyth's was mentioned; and Smyth's is a complex and defective arrangement, whereas his is portable, being held in one hand, and being capable of moving for an indefinite time, while Piazzi Smyth's depends upon a motion given at the commencement, and gradually dying away.

Mr. Garvey was invited to submit evidence of priority and completeness of invention to the Club, who will investigate it, and, if found satisfactory, endorse his claim.

Mr. Pomeroy being invited by the Chairman to give some account of the minerals of Missouri, excused himself on account of the extreme shortness of the notice, but gave quite a romantic account of his discovery of the locality of an abandoned silver mine in Missouri.

The Chairman called attention to an article in the Daily Times, advocating the adoption of small cars upon the Hudson River railroad. When, however, some years ago, he urged the employment of steam locomotives in cities, the editor of the Times laughed at the suggestion that within ten years they would be found in large cities. He now advocates the same idea.

The Chairman suggested that the subject of the evening, franklinite, be examined by the club in the following order:

1st. Analysis of the pig metal.

2d. Determination of the melting point.

3d. Degree of hardness of the metal, and circumstances which render it "hard," "harder," and "hardest."

4th. Tenacity of the wrought iron.

5th. Capability of conversion into steel.

Further, he suggested the appointment of a committee, to make out a full report of all the facts elicited by the Club on this topic.

Dr. Deck would strive to find time to analyze the metal, if another chemist be appointed with him.

The Chairman read the following letter:

NEW YORK, *January* 6, 1860.

Prof. MASON, *Pres. Polytechnic Society*: Sir—Learning that one of the subjects of discussion before your Society is franklinite, I have taken the liberty to send you a specimen of the franklinite pig iron, produced at the works of the New Jersey Zinc Co. This iron is designated by metallurgists as *Specular Iron*. It is remarked for its very white, silvery lustre, and the very large crystaline facets, and its foliated or lamellar structure. It is extremely dense, having a specific gravity of 7.69, being from 10 to 12 per cent. greater than ordinary iron. A remarkable feature of this iron is, that the large crystals and facets are not attracted by the magnet.

A very careful analysis of this iron gives—iron, 88.30; carbon, chemically combined. 5.48; carbon, free or graphite, 0.00; manganese, 4.50; silicium, 0.20; sulphur, 0.08; phosphorus, 0.15; zinc, 0,30; loss, 0.99=100.

It is proper to state that this iron by itself, from its extreme hardness, is not suitable for castings. It is chiefly employed for conversion into bar iron—a specimen of which is herewith presented. The aspect of the fracture shows it to be a bundle of fibres.

A careful test of the iron in the hydraulic press, of a bar one inch square, required a weight equal to 77,000 lbs. per square inch, to tear it asunder. This shows it to be equal to the very best iron known to commerce.

I am pleased to know that this subject has presented itself to your Society; and I trust the discussion will do much to discover many valuable properties in this iron yet unknown. In this hope, I am sir,

Most respectfully, your obdt. servt.

HENRY AITKEN,

Prest. N. J. Zinc Co.

Dr. Deck thought an analysis would give more phosphorus, probably owing to oyster shells being used as a flux.

Mr. Seely has before seen the analysis given in the letter, under the names of Drs. Dickinson and Jackson, and thinks it reliable, but no one analysis can determine anything about the matter, for the nature of the compounds will give different results under different circumstances. The mineral is a definite chemical compound, as definite and as pure as water, containing oxyde of iron, oxyde of manganese, and oxyde of zinc. Franklinite is composed of one atom of oxyde of iron, one of oxide of zinc, one of sesqui-oxyde of iron, and one of sesqui-oxyde of manganese. There are analyses given in many modern books, and in several quite old German books. When reduced to the metallic state, there is an alloy of tin, manganese, iron and zinc formed. What then should be the character of the alloy? The zinc being volatile, should be driven off by the heat. Overman states that zinc can be driven off by heat alone from the galvanized iron. The zinc then escapes in proportion to the amount of heat, and to the length of time during which the heat is continued; and consequently two specimens would not give the same analysis, unless all the circumstances were the same. The amount of zinc, however, is always very small; its effect would be to render the metal more brittle. Considering the zinc out, we have an alloy of iron and manganese. In franklinite, iron is to manganese as 42 to 28.

In the pig metal, iron is to manganese as 88 to 5.

Manganese is a very oxydizable metal, consequently it is consumed by exposure to heat in an open fire, and there may be a variation of from 10 to 20 per cent. of it in any amount of specimens. The hardness is due to the manganese. Dr. Vanderweyde, last evening, showed from Berzelius, that alloys of manganese and iron were long known to be very hard. At a white heat the manganese is all burned out, and ordinary iron is left. The burning out of the zinc and manganese is a valuable feature, for, while doing so, they take off the sulphur and the phosphorus. Therefore, the best pig metal can be made from it. I thought last evening that it could not cut glass, but to-day a specimen, which I supposed contained more manganese, has cut glass; and no doubt the metal is excellent for making steel. The composition of steel has been settled by Mr. Binks of England. It must contain nitrogen as well as carbon. The specimen hardened by Mr. Butler, seems to contain more manganese, and to differ from steel.

Mr. Butler.—There are portions of the metal which melt easier than others, so that melting away they leave a cellular structure, the walls of the cells being more dense than what melted away, and being somewhat different from ordinary metal.

Dr. Stevens doubts that any sulphur or phosphorus is to be found in the franklinite mineral. Judging from its geological position, the sulphur and phosphorus must have been driven off by the heat which rendered the rocks metamorphic. The sulphur found by analysis is most likely derived from the fuel—anthracite certainly would yield it when used—and the phosphorus is from the flux.

This mineral is found in abundance only in a very small belt of altered limestone, in Sussex Co., New Jersey, while the zinc is found to extend five miles as a deposit, with limestone above and below, the zinc appearing again in Pennsylvania. Wm. Kitchell, Esq., M. D., gives the following section of the azoic rocks, showing the thickness of strata:

6. Limestone of dark blue color, granular, silicious, calcite,.... 150 feet.
5. Limestone, bluish grey, compact, with seams of quartz,..... 120 do

4. Limestone, light blue, silica,	65	feet.
3. Limestone, dark blue,	120	do
2. Limestone, dark blue, crystalline,	30	do
	485	
1. Gneiss, as seen,	20	do
Total thicknesss of strata,	505	do

The limestone dips 20° to 25° to the N. W.; gneiss, unconformable, dips seven deg. to S. E , accompanied with quartz, feldspar, and silica.

The ledge of altered limestone extends from Sparta with a N. E. and S. W. trend to Eden, in Orange co., New York, and contains the following minerals, most of which are found within a few rods of each other:

Franklinite, octohedral, beveled edges; garnets of every shade of hue; willemite; manganese; calcite, white, salmon-colored and striated; zinciferous calcite; blend, opaque, black, heavy, yellow; fluor spar; galena; cerutite; chalcopyrite; malchatite; azurite; quartz; jasper; magnetite; talc; mica; hematite; pyrites; calamine; hornblende; apatite; ephodite; feldspar.

Mr. Pomeroy wished to know what had been analyzed; metal made directly from the ore, or from the residuum of the furnaces in which zinc is prepared?

Mr. Curtiss.—There were some pigs made from the residuum of the zinc manufacture. We have had several analyses made by Dr. Jackson, of Boston, and Dr. Hays. The ore has never shown a trace of sulphur or phosphorus. When analyzed by Dr. Hays, the zinc has been found to take off the sulphur and phosphorus to the top of the chimney where they parted. The residuum sometimes contains three or two and one-half per cent. of zinc, and this is enough to take off all sulphur and phosphorus.

Mr. Stetson wished to know if there was any reason why metal from the residuum should differ from that from the ore direct.?

Dr. Stevens considered that the greater amount of heat required by the residuum would be the only cause of difference. It is a remarkable ore, not containing any impurities, such as silica or alumina. If the pig were made from the ore with charcoal, there would be more per cent. of zinc than if made from the residuum; there would be, also, more manganese.

Mr. Pomeroy thinks it of great importance to settle that point, as its commercial value would be affected by the amount of impurities; for, if used for iron alone, twenty to thirty per cent. of franklinite with a rich iron ore would be useful. The pig would be white and crystallized if from the ore pure. The residuum may show a trace of silicium, derived from the ground upon which it lay; but the amount of zinc must be exceedingly small, for, as said by Mr. Seeley, there cannot be an alloy of zinc and iron, but the zinc is of great value for taking up the sulphur, oxygen, &c.

Mr. Tillman.—It is immaterial whether the metal be made from the residuum or ore, for the iron will not fuse until at a higher temperature by £ . 00° than zinc; therefore, in any case, the zinc will be driven off.

Prof. Mapes would like to know, whether the hardness of franklinite iron was due to the presence of zinc or not? Practical men say the hardness exists always with zinc, never without; and hardness is the valuable quality we want to determine.

Mr. Pomeroy.—There must be some cause to produce the crystallized white pig metal with an amorphous crystallization, some crystals being harder than others; if the metal be run into a mould of wet sand it will crystallize differently from what it would if run into one of dry sand. This iron takes up carbon. If it has not been fully scorified, all the impurities may not be taken out; they may cause this hardness, but the zinc cannot. When the iron is perfectly scorified and carbonized, it forms an ordinary cast iron of good quality.

Prof. Mapes.—I have seen plates crushed out of this metal, the crystallization being destroyed, and yet it was extremely hard.

Melting point being called for by the President—

Mr. Butler could not give the degrees, but in experiments in a circular oven of coal, giving a low white heat to low bar iron, or a high red heat, the metal flowed at a brilliant red, and when covered with borax it flowed around and all over the iron, its surface giving a perfect mirror. At ordinary red heat it would chill.

Red heat is about 1,000°, and white heat about 1,850°, so Mr. Butler judged the melting point to be about 2,000°.

Mr. Pomeroy.—There are no means of making a thermometer which will measure directly temperatures as high as the melting points of the metals; there is, therefore, no definite measure for them, and we are left partly to conjecture. The melting point of iron is about 2,500° Fahrenheit. In this metal there is no graphitic carbon—that is, iron combined with an excess of carbon—it is simply a kind of steel, and if thoroughly scorified—deprived of impurities—it is pure steel of the best quality. It is, probably, the most important mineral at this moment on this continent. As to its separating from iron which has been plated with it, the thing is impossible; it is molecularly united with the iron; they consequently cannot be separated. Good bar iron can be made from ordinary ores by the aid of franklinite at *one-half its present price.*

The President inquired whether this mineral had been found in any locality in Europe? On this subject there was no definite information, but Dr. Stevens mentioned some few localities in England where accidental specimens were found—probably mineralogical specimens which had been lost from cabinets.

Mr. Johnson mentioned some interesting experiments tried with franklinite, to make alloys of it and copper, silver, &c. He had noticed a specimen of copper so alloyed to become more sensibly magnetic than the franklinite metal, but still only feebly so.

Mr. Pomeroy stated that all metals will fuse at low temperature if the proper flux be employed. Platinum will fuse at a dull red heat if arsenic be used as a flux.

Mr. Tillman.—That is precisely the point we want to get at. Iron will melt at no temperature lower than its normal melting point except a flux be used.

Mr. Seeley.—The melting point of an alloy is always lower than the mean of the melting points of its components. Manganese requires a higher temperature than iron; iron than zinc. The modes of measuring high degrees of temperature being alluded to, it may be well to describe what may be called the "flame thermometer." All substances will burn in a flame—cast iron will burn in a candle. Throw minute filings of cast iron into the flame of a candle, and they will burn with brilliant scintillation. Platinum will also melt in the flame of a candle, if presented in the form of a very fine wire. Upon this fact the flame thermometer is based. A Bunsen gas lamp, which gives a definite size of flame is used, and when pure oxygen is employed as the supporter of combustion, a temperature of 16,000° is obtained, which is the highest that has been measured. By adding nitrogen to the oxygen, the temperature of the flame can be reduced *ad libitum,* the amount of mixture determining the temperature.

Mr. Serrell melted franklinite pig-iron readily, and cast it into plates, cylinders and irregular forms, with ease. He was much interested in the experiments by Dr. Vander Weyde the last evening, showing how this iron could withstand the action of nitric acid in a Grove's cell. About a year ago, he had ascertained that though it will remain untouched while suspended in the cell, yet, if it be made a part of the circuit, it is soon acted upon and corroded.

The Chairman feels certain it was never found in Europe to any amount; that it is peculiar to this country, and will prove invaluable in manufactures.

Messrs. Stevens, Serrell and Seeley, were appointed a committee to collate all the information elicited by the club on this subject for a final report.

The subject "Aluminum," was selected for the next meeting. After which the Association adjourned.

POLYTECHNIC ASSOCIATION, AMERICAN INSTITUTE,
January 12, 1860.

Prof. C. Mason in the chair. Mr. Johnson, Secretary.

Mr. Garvey presented a steam gauge invented by Mr. James Montgomery, of Newark. This gauge depends for its action upon a weight instead of a spring, the piston resting upon a silk diaphragm. Mr. Garvey said this diaphragm had been used two years with satisfactory success. Mr. Patrick presented a patented variable exhaust. The chairman believed that the interest of inventors and the public good would be promoted by the deposit of a model in each case; he should therefore ask this from each inventor in subsequent cases. The variable exhaust and the steam gauge were referred to a committee, consisting of Messrs Butler and Diven.

The report of the committee on franklinite—appointed last night of meeting—being called for, Dr. Stevens, as chairman and geologist of the committee, read a very able and elaborate report upon the geological formations in which franklinite occurs, and incidentally gave a view of the metaliferous strata of the United States, particularly the Atlantic seaboard. And Mr. Seeley, as chemist, gave a full account of the chemical analysis made of the mineral, the pig metal, etc. Mr. Serrell was not present to report on the practical working of the metal and the uses to which it has and can be applied with advantage, consequently the committee were directed to report in full on the next evening, their number being increased by the addition of Professor Mason and another member; and their duties being extended so as to cover a full and complete report upon the whole ground covered by the subject.

Prof. Mapes said Mr. Selleck several years ago melted 5 per eent. of the franklinite ore with 95 per cent. of other iron, which made a compound of superior quality.

Mr. Johnson had tried some experiments in regard to the fusibility of franklinite. He found copper fused in 12 minutes, the new cent in 14 minutes, and the franklinite in 21, the fire being kept as nearly uniform as possible.

The subject of the tenacity of the franklinite iron, or, in other words, its strength as a metal, was then taken up. The chairman showed a bar of iron made of 80 per cent. of magnetic iron ore with 20 per cent. of franklinite. Part of it was used for shoeing horses and making horse-nails. Its tenacity is said to be exceedingly great. He also showed a specimen which had been polished. He also presented another sample furnished by the New Jersey Zinc Company. Col. Curtis described the operation of combining the franklinite with the Allen mine ore. He also read a paper giving statements of facts upon these points:

"This sample of wrought iron was made at Milton, N. J., by Wm. C. Scofield, in Col. Stanborough's forge fire. Charcoal fuel, 280 pounds of charcoal to the ton, 20 per cent. of franklinite ore, 80 per cent. of magnetic ore from the Allen mines. The ore from that locality made what the workmen call a hard 'frizzly' iron. Breaks easily under the hammer, and in drawing down will probably lose in scales about five or six hundred pounds per ton. The Allen ore is sulphurous. Both ores were crushed as fine as a grain of rye before putting them into the forge. The charcoal was first lighted, and the ore was then thrown on, about 20 lbs. every 15 minutes."

Mr. Pomeroy wished that manufacturers of this metal would give exact data, so that we should be able to ascertain correctly its tensile strength and upon what its peculiar excellence depends. New experiments, differing altogether from the old and less perfect ones, should be instituted. The peculiar effect of franklinite upon other ores has not been fully shown. It takes up the impurities—sulphur, phosphorus, etc., and thereby renders them more easy to work and the iron produced more valuable. I have devised a new and excellent method of scorifying the metal—of completely removing the impurities by getting them to mix with hydrogen. I send jets of super-heated steam through the melted metal, so that the hydrogen of the water may take up the impurities and the oxygen aid in combustion, and I get the metal well scorified by this means. In the compositions and decompositions which take place in the furnace, the zinc takes up oxygen and sulphur, forming thus a white flocculent sulphurous oxyd of zinc. The oxygen, carbon, and sulphur would, if combined, form *scoriæ* having all the characteristics of a mineral, and not those of a workable metal.

Mr. Seeley, in commenting upon Mr. Pomeroy's plan, as a chemist, doubted the gentleman's theory, that the hydrogen would, under the conditions mentioned, combine with the zinc, carbon, iron, or manganese, in preference to the oxygen, and that, if it did, a sufficient degree of heat could be maintained for the purpose. It is true that very high temperatures modify the affinities of chemical elements to a great degree, and that hydrogen combines under such circumstances with carbon, &c., more readily than at lower temperatures; but still there is nothing in that simple fact which would warrant us in supposing that a jet of steam will *scorify* the metal. The zinc performs that part quite well, and the great affinity of the manganese for oxygen makes this element of prime importance in reducing the oxyds of the zinc and iron. The zinc being volatile, passes off in vapor combined with the sulphur, if any, and taking oxygen from the air in the furnace forms the flocculent oxyd referred to, leaving the metal as Mr. Pomeroy says, thoroughly *scorified*.

Mr. Nash wished to know if Mr. Pomeroy had ever passed a stream of electricity over this heated iron after it was reduced; and he wished to know if all alloys did not absorb electricity, and whether it was not necessary for the production of water. Professor Beck was engaged in examining a specimen of iron in Europe in which he found a small quantity of vanadium. It made a fine steel and was used for watch-springs.

Professor Reubens said the instances were numerous in which the tensile strength of alloys is greater than the tensile strength of their ingredients. Steel is not pure iron, and it is yet the strongest metal we have. Iron is said to have been recently alloyed with tungsten, and a stronger alloy than even steel has resulted. He thought the affinity of the ingredients which form the alloy often cause them to combine with greater force, and therefore the power of aggregation was stronger.

Mr. Tillman thought the atomic weight of manganese and iron was so very nearly the same that they combined very readily, and for that reason an addition of strength is produced. Dr. Vanderweyde thought that the alloys combined in different atomic proportions, and if the proportion is changed the property of the alloy is materially changed.

Mr. Curtis mentioned some important applications of the combined metal —franklinite metal and iron—in which great advantages were derived from the employment of even a small percentage of franklinite. Mr. Francis Alger, of Boston, by employing 12 per cent. of franklinite., was able to manufacture chain cables of greater tensile strength than any heretofore made. Jones & Co., were about to abandon the manufacture of iron pipes until they began to use franklinite in the proportion of from five to twenty per cent. when their tubes were found to be of such excellent quality that they got as much work from the city (New York) as they could do. And afterwards the city of Albany took all the water pipes they could supply. Washburn & Co. have drawn wire as fine as No. 32 from the puddled bar direct.

The subject for next Thursday's discussion will be "Aluminium" and "Zinc."

POLYTECHNIC ASSOCIATION OF AMERICAN INSTITUTE, *January* 19*th*, 1860.

Prof. Mason, chairman. John Johnson, Esq., secretary pro tem.

During the half hour devoted to miscellaneous business, Mr. Montgomery exhibited a specimen of his cast iron pavement, which was deemed a considerable improvement upon the kinds in common use. It consists of undulating ribs formed upon plates of cast iron, in such a manner as to afford a "hold" or "grip" for horses feet, both in the line of traction and in a lateral direction, to prevent slipping.

Mr. J. W. Worthen brought before the club his method of calculating interest and making averages. He gave no explanation of his method, and seemed resolved to be mysterious.

Mr. Wykoff explained his method of saving the minute particles of gold which are found floating in the water employed in gold washing. His method is to place mercury in a trough over a fire, the trough being filled, over the mercury, with water. The vapor of the mercury, rising through the water, meets and amalgamates the small specks of gold, and the amalgam settles down again, the mercury being condensed by the cold of the water which in an open vessel can never become hotter than 212 deg.

Professor Mason, the chairman, introduced the subject of the evening, by reading the following paper on

ZINC.

In a remote age the metals known to man had reached the sacred number seven. Gold, silver, copper, mercury, tin, lead and iron, equaled the seven days of creation, the seven stars, the seven colors of the rainbow, the seven sounds of music, the seven sons of Job, and the seven wise men of Greece. To have searched for more would have been presumption in a philosopher, and impiety in a priest.

But nature thrust upon the notice of lead miners an *eighth* substance, which had a faint metallic lustre, and was fusible at a low point, but was extremely brittle and intractable, and the miners rejected it as "blind lead." But nature (regardless of popular opinion) thrust this same material on the attention of metallurgists, in combination with carbon and silica, until the alchymists resolved to examine it.

They put the ore into the crucible, and at the end of the roasting found nothing left but a blackened sand. The shining particles had escaped. If it was a metal, it was volatile and invisible at its escape. They then tried to fix it by combining some other substance. In these experiments they tried copper. The result was a bright yellow metal, harder and heavier than copper, which they at first mistook for gold, but were finally content to call "brass." Sixty pounds of copper treated with the strange ore gave them 100 pounds of brass. They had discovered a new metal, and set vigorously at work to separate it from impurities and alloys, and finally succeeded in confining its volatility and producing metallic zinc, which the first ships of the East India Company brought from China at about twenty-four cents a pound. Still it was a brittle, intractable metal, fit only to make brass. But the uses of brass increased rapidly, and the desire to cheapen that useful metal led to the invention, in Europe, of the retort process of obtaining zinc metal. This was followed (in 1806) by the discovery of the vast deposits of zinc ores in Belgium and in Silesia.

The products of these mines soon glutted the market of the world, and brought down the price from twenty-four to four cents a pound.

Ingenious men undertook to find out new uses for this cheap metal. Their attempts were rewarded by three inventions, which are to be noticed in the order of their occurrence.

A man of Glasgow undertook to handle metallic zinc at every temperature. At 230 deg. of Fahrenheit he found it malleable and ductile, and up to 300 deg it behaved in the same laudable manner; and this capacity for good conduct continued in the rolled metal until it was again heated above 300 deg., when it again became intractable and crusty.

Immediately "sheet zinc" began to take the place of sheet iron, sheet tin and sheet lead; and being insoluble in water, and but slightly subject to oxydation, it rose rapidly in favor with the public, and new uses were constantly arising. This was the first invention.

Meanwhile an ingenious Frenchman conceived the idea of converting zinc metal into an oxyd, and using it in oil as a paint, in place of the oxyd of lead, which was known to be poisonous to the painters, and to the inmates of recently painted houses.

He first obtained a coarse paint of a dull color, but after thirty years of experiments, in 1849, Leclaire produced "zinc-white," which immediately commanded such notice and commendation, and public patronage as the French nation and government bestow only on great public benefactions. This invention opened a market for all the zinc product at a better price. This was the second invention.

During the same period zinc-ores had come into notice at various points in our country, from Sterling Hill, in Sussex county, N. J., throughout the Saucon valley, extending southwesterly through Pennsylvania, Virginia and Tennessee, but especially at Sterling Hill, and near Bethlehem, in Pennsylvania.

The Hon. Samuel Fowler, Senator in Congress, aware of the mineral treasury in Sussex county, had purchased from the heirs of Lord Sterling thousands of acres at and around Sterling Hill.

Without knowing what was passing in France, Mr. Fowler began, more than thirty years ago, some rude but partially successful experiments to separate the zinc of Sterling Hill from the franklinite, with which it was combined, and to convert the zinc into paint. His paint resembled the first paint produced in Paris. He applied it to the weather-boards of a coarse building, and twenty years after it was found an effectual protection to the boards.

In 1844 Mr. Hassler made from the ore of Sterling Hill the zinc for the brass weights and measures, ordered by Congress for the several States, but the cost of separating the zinc showed that the metal could not compete with the foreign article.

While the owners of the mine were perplexed at this result, one of their number suggested to Mr. Gay an experiment, which he made the same day.

At his office in Nassau street he had a heap of the red oxyd of zinc. Breaking up a parcel of the ore, he threw it on the top of an anthracite coal fire, in a cylinder stove. When the zinc began to flow from the ore, he held it over a clean fire-shovel. On withdrawing the shovel he found it coated with a snowy-looking substance, which he brushed off, carried it to a paint shop, and prepared it in oil, and with a clean brush spread it on a shingle, where it dried in a short time, and left a coat of smooth, hard, white paint. This humble experiment was soon wrought out into that ingenious device called "the bag process," for making white oxyd of zinc directly from the ore. This was the third invention.

Of the five stages in the history of zinc, the first and the last—the making of brass, and the making of zinc white—the alloy and the oxyd, directly from the ore, were the most remarkable, and, perhaps, the most important. The accidental production of brass seems to have led to the discovery of the metal. Brass had been long in use, when Paracelsus produced the article, which he said was "a metal and not a metal, and seemed to be composed chiefly of the ashes of copper;" and for some reason not now apparent he named it "Zincium."

The zinc product of Europe comes chiefly from the furnaces of the Vieille Montagne Company, near Aix la Chapelle, in Belgium, and a large part of it is made into brass at Swansea, in Wales. The ores of other countries are sold in Belgium; and the quantity taken from the Belgium mines is comparatively small. The ordinary price of good ore at the furnace is $17 a ton, and the coal used in its reduction costs $7 a ton; and, unless new mines are discovered in Europe, the cost of producing metallic zinc must be increased. The total product of the year 1859 probably exceeded 70,000 tons, and the new year opens with an increased demand.

The early attempts to produce metallic zinc in New Jersey failed for want of a suitable clay for retorts. But an excavation for the railroad from Easton to Philadelphia opened a supply of the very best fire clay, and preparations are now in progress at Bethlehem, by two companics, for making metallic zinc. But these companies, and the companies in New Jersey, regard the zinc white as a specialty peculiarly their own, in which they have a natural monopoly, because the anthracite coal is requisite to its production; and for it their own country is a sufficient field, while the market of the world is open for all excess.

The two active zinc mines in our country, at Sterling Hill and Bethlehem, are sufficiently opened to show that they can produce 50,000 tons of zinc white per annum. The advantages of the two vary in several particulars, but in a general average they are well balanced.

The red oxyde of Sterling Hill is a strict peculiarity. The ores of Bethlehem are the sulphuret, the carbonate and the silicate of zinc. In purity they range from forty to sixty-one per cent of pure metal, and compare favorably with the workable ores of Belgium.

Experience at Bethlehem shows that ore can be brought to the furnace at $2 a ton, and the coal at $1.80. With these advantages over the prices in Belgium, it is obvious that all our disadvantages, as beginners, must be overcome; and especially when our ores are reduced to zinc white by a single process.

As to the extent of our zinc field, it is remarkable that, in Knox county, Tennessee, at the southwestern end of the valley, which has the mines of Bethlehem at its northeastern terminus, the zinc mines resemble those of Bethlehem; and the same metamorphic lime-stone, which contains both of these deposits, is known to predominate in the eight hundred miles of intervening valley, suggesting the vast metallic treasures yet to be explored. The zinc ores of Bethlehem might have been unknown at this day, had not a scientific German employed in the Moravian school brought them into notice.

The coal for the reduction of the various ores of this long valley are deposited at convenient distances, in the slopes of the same valley. But, both ores and coals would have been useless, had not the railroads been laid at the bottom of the valley. To open the mines is no longer an act of faith, but of discretion. The great American act of faith appeared in building the railroad. If there was frenzy in this act of faith, it was a prophetic frenzy, which the disclosures of time will show had in it a forecast of such reach and depth, as could not then be comprehended; and the mad projector may say with Bacon "my reputation I bequeath to future times and other nations." The railroad system has ripened the metallic harvest of the Western Continent. This harvest is destined to hasten the cultivation of the whole tropical region, by the introduction of cheap machine-labor; and the natural consequence will be, to homogeneous continental civilization, more rich than the earth has ever known. This civilization will draw to its service all the chemical and vital forces within its reach; will so adjust its whole machinery that no spring or lever, no nerve or muscle shall carry more than its just weight; and will distribute its fruits so freely that Peon and Cooly and African shall find in it a longer, higher, happier life than they knew in Africa, China or Peru.

But every new and great movement, in the development and use of a metal passes through its speculative and experimental phases. Iron, copper, lead and zinc have all had their impulses and reactions before their production and use became permanently established.

Silently but surely the zinc white of the New Jersey and Pennsylvania mines has made its way into the market for white paints, at home and abroad. During the past year these mines yielded about seven thousand tons, which was about ten per cent. of the white paint consumed in the United States. London is a market for a portion of this article; and the ores are profitably exported to Belgium.

In 1854 the white paint applied to ships and boats in the United States exceeded the total consumption of the same article in Great Britain.

As a substitute for lead the zinc white must depend mainly on its being better and cheaper. The mere fact, that zinc is *harmless* while the *lead poison* cuts off one-fourth of the life-time of all who are employed in painting, might be expected to aid the change; it might be said, rather plausibly, that painting with lead is a cruel business, worse than building a Panama railroad, because the thousands poisoned to death in that work provided a safe passage for travelers in all future time; worse than the sale of intoxicating drinks, because wine does make glad the heart of man before it biteth like a serpent; but, this reasoning would be ineffectual, because the poison of the lead is invisible and operates silently. Laboring men cannot be brought to think about a tax on their earnings or their health, if it only operates indirectly and leaves them the power to get along. If laboring men should take a turn for such thinking they would become troublesome to the committee of ways and means, and to the iron masters of Pennsylvania.

With nineteen-twentieths of the coal field of the whole earth, with the zinc mines of Europe beginning to fail and ours just coming to the light, and with a call for the products of these mines, which is advancing the price, we cannot fail to be large exporters of the cheapest as well as the dearest of the soft metals—zinc and gold—metals from the north, as well as cotton and rice from the South, will swell that commerce which is giving peace to the nations and prosperity to individuals.

Mr. Seeley.—The menton of the name of Paracelsus suggests the importance of the labors which he and the alchymists performed. To them is due the discovery of most of the metals; but their methods of investigation were so crude, that if *oride* were known in their day, it would have passed as gold. Calamine is a silicate of zinc. It becomes magnetic when heated. Zinc, when heated to 300°, becomes malleable; at 400°, it is brittle; at 500° it is still more brittle than when cold; heated still more, it vaporizes at 700°. The vapor is both very light and very heavy. In a brass foundry the place is all filled with vapor which is oxyd of zinc. If no air were present, the vapor would be metallic zinc. The Belgian apparatus for distilling zinc in a common gas retort, or a series of upright tubes, the vapor being condensed in water. The English is a crucible-formed retort. These retorts of all kinds are set in rows of ten or more together, the space between being open for attendants. There are two ways of employing zinc to make brass: 1st. The zinc is put into a crucible with the copper over it, and both are fused. 2nd. The zinc is fused and strips of copper are introduced into the melted mass, the quantity of copper determining the color and properties of the brass. In making bronze powder, however, the color is due rather to the degree of heat employed, than to the amount of copper. The silicate of zinc is not generally worked, unless when it is associated with the carbonate. The silica must be got rid of some way. The carbon from the carbonate, and the sulphur from the sulphuret, can be driven off by roasting. It may be well to call the attention of members to the "plastic chloride of zinc," which may have great use in some branches of the arts; also the covering of walls with zinc paint is another subject of importance.

Professor Mason.—Ingenious men ought to devote their time to the discovery of an efficient mode of covering iron pillars, ceilings, etc., with this substance, which would then favor the building of *fire-proof* buildings, which ought to be the only ones now in use in the cities of civilized men.

Dr. Stevens drew a diagram illustrative of the *bag-process*.

Professor Mason.—There has been considerable improvement made in Pennsylvania, so that they now produce an article almost equal to the French zinc-white. Mr. ———, an American merchant has taken hold and has sold two tons in London. In speaking of the adulteration of white-lead with barytes, I may say that formerly manufacturers sold their own white-lead, and their *brand* was known, but, when middlemen were allowed to grind and use heavy spar, there was no certainty as to the quality of the article. Mr. Pierce, the leading paint merchant, will buy white-lead from Brandwith & Son, of London, only. Now there is no field more open for improvement than the manufacture of zinc-white. The French article is worth from nine to ten cents a pound, while the Pennsylvania is worth only from four to six.

Dr. Gould in working silver, found the solder rough from using to much heat. Probably the zinc was driven off at 700°, while the copper and silver fuse at about 1900°.

Professor Tillman.—The atomic weights of zinc and copper are so nearly alike that they unite to form a homogeneous compound, which accounts for brass being so uniform in composition.

After some general conversation on water-pipes of wood, lead, iron, etc., the Association adjourned.

Subject for next meeting, "Zinc."

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE, *January 27th*, 1860.

Prof. Mason, chairman. John Johnson, Esq., secretary pro tem.

Mr. John M. Wykoff showed some interesting experiments illustrative of his method of saving gold particles from miners' waste.

1st *Experiment*.—Finely ground quartz containing iron, silicia, and gold being thrown into water, the silicia, which is the lightest, sank, while the heavy iron and gold floated.

2d *Experiment*.—Mercury was introduced into the glass tube in which the water and ground quartz had been put, and heat was applied by means of a spirit lamp. Long before the water boiled the mercury went into violent ebullition; globules rising through the water at the sides, and sinking in the middle of the tube.

Mr. Wykoff stated that this ebullition takes place when the heat is not more than 90 degrees, though mercury requires 650 degrees to convert it into vapor.

His theory is, that though mercury is thirteen times heavier than water, yet the water insinuates itself between the mercury and the bottom of the containing vessel, is converted into very elastic steam, and drives or blows up the mercury through the water.

Mr. Butler controverted this theory, not with the view of proving it false, but of eliciting more information on the subject.

Professor Hedrick mentioned a laboratory experiment, which confirms the fact that gold, though nineteen times as heavy as water, floats under some circumstances. Gold dissolved by the aid of oxalic acid will float. Indeed, it is well known that minute particles must float. It is also well known that heat aids precipitation of gold from solution. Therefore Mr. Wykoff's plan seems to accord with received chemical theories, but to put it to strict test he would propose:

"That a committee be appointed to investigate Mr. Wykoff's method of saving gold."

The committee, consisting of Prof. Hedrick and John Johnson were so appointed.

Mr. Garvey exhibited some specimens of prints produced by Turner's "Photolithographic Process."

The specimens, "*Sunny Side*" and "*Washington Heights*," J. G. Bennett's place, were greatly admired.

The report of committees being called for, they reported as follows:

JAMES MONTGOMERY'S STEAM GAUGE.

The committee respectfully report—

That they have examined the Pressure Gauge submitted to their inspection, but have not seen it under pressure, nor had opportunities to test it; they can therefore only give an opinion on the principles of its construction.

It is designed for stationary engines exclusively, and by using a weight instead of a spring, is intended to avoid the inaccuracy which sometimes results from corrosion, wear, change of temperature, or other accidents to which springs are liable.

The weight is in the form of a pendulum, and operates on the principle of the pendulum balance; and it appears to your committee that it will operate well, and truly indicate the pressure, and that if the parts which are liable to get out of order should at any time fail, the indication will still be correct, unless the derangement is so great as to be discovered.

Your committee therefore recommend the gauge as having an element of safety that is wanting in gauges that are used for locomotive and marine engines, and as being otherwise as simple and easy to construct as other gauges that are in common use.

J. K. FISHER,
W. H. BUTLER,
FRANK DIBBIN,
Committee.

Jones Patrick's Variable Exhaust.

The committee respectfully report—

That they have examined the model submitted to them, and consider its principles, and the necessity that exists for its use, and have compared it with other devices for the same purpose.

They are informed that there are comparatively few locomotives which can make steam freely with wide blast orifices. Most engines use narrow orifices, which cause back pressure, but do not need that the orifices should be at all times so narrow. It therefore appears that such engines might be benefited by a variable apparatus.

In examining the variable exhausts in use, your committee find that none are entirely free from objections. Some obstruct the steam by internal cones, solid or hollow; others obstruct the smoke, by projections outside; others are defective in the mechanism by which they are changed.

Mr. Patrick's may be made entirely free from internal obstruction. It has an external obstruction, which, theoretically, is objectionable. The nozzle should taper on the outside nearly to an edge, so as not to cause eddies. The amount of this objection is not known by trial; but your committee believe it to be less than that of other forms.

The mechanism by which Mr. Patrick changes the orifices appears to be excellent, and your committee believe that the objection they have referred to is on the whole less than the objections which lie against the other forms of variable exhaust which they have seen. And they recommend it to those who have engines that cannot do their heavy work with orifices of liberal size.

J. K. FISHER.
FRANK DIBBIN,
W. H. BUTTLER,
Committee

Professor Mason introduced the subject of the evening, "Zinc," which was continued from last evening, by remarking that the "bag process," has produced seven thousand tons of "zinc-white" in the past year; that zinc-white and zinc ores are now regular articles of export, and that the mines at Sterling, and at Bethlehem can produce more zinc-white than is now produced in the world, at prices which must find a market, and drive the poisonous white-lead out of use in all civilized countries.

Col Curtis described the bag process as follows: The zinc ore is crushed fine and mixed with coal-dust, after which the mixture is placed in a zinc furnace, about the size of a common dutch stove. Heat being applied, the zinc rises in vapor, passes through the flue, and is caught in a "bag" at top, from which it is afterward collected in the form of a snow-white powder. This is formed directly from the ore.

Mr. Seeley gave an analysis of the lemon-colored oxyd of zinc belonging to the Jersey Company, which showed that the impurities were iron and manganese. There is no metal more easily reduced than zinc. The apparatus should be a retort with a wide cupola, for the zinc is driven off at a read heat in the metallic state, if no oxygen be present; but if oxygen be present, the zinc will be converted into a white oxyd, which is sometimes called "philosopher's wool." Red oxyd predominates as an ore in New York.

Mr. Churchill gave some account of the localities in England where zinc is found. In Somersetshire, England, near Wells and Bristol, there is a limestone range 800 feet above the level of the sea. This contains four kinds of metal; an ore of zinc, one of lead, mercury, and iron. In the time of Elizabeth, the poor were allowed to work the minerals in this district which was included in the Royal Forest; and so unimportant was zinc esteemed that no royalty was levied upon it.

Professor Mason.—Zinc was taxed by Pitt, so that he ascertained exactly the produce in England in his day, and that was greater than at any time since. England has got her zinc principally from Silesia; now she begins to get it from this country.

Mr. Curtiss.—In Ure's Dictionary, a "bag process" for collecting lamp-black is described, but in that process the bag is open; in the other case the bag is closed.

Mr. Churchill.—Long flues are used in England for collecting zinc.

Professor Mason.—There are three points in the "bag process." 1st. The bag is tied up. 2d. A blower is used to create an artificial current of air through the furnace. 3d. The furnace is made so as to be fed with fuel and ore from the top. It may be well to remark, that the lowest price at which the English East India Company sold zinc was thirty cents a pound.

Dr. Stevens.—America can and will furnish zinc and all other metals in sufficient abundance for the world, because our geological and mineralogical formations are developed on a grander scale than in any other part of the earth. We have not yet developed our resources nor explored our strata.

Mr. Seeley.—Has seen many persons who have traveled in China, India, and other countries, but they could give no account of the arts there practiced. But from some small paintings on mica, he learned how the Chinese blacksmith works, what the shape of his tools are, etc. So we learn from their boxes their mode of working and joining wood, etc. It may be well to state that "cadmium" is now found in England, and has not yet been found here. It is worth $2 a pound.

Prof. Mason, during college vacation, examined Sir Wm. Jones' work in 10 volumes, and Meadows' work, and got no information of the knowledge possessed by the Chinese, or other Eastern nations, on metals and ores. Frequently he inquired of missionaries, merchants, and diplomatists, but they were all interested in other matters, and neglected the arts and sciences.

The same ship which brought zinc at thirty cents a pound, and cotton cloth at eighty cents a yard from the Deccan, lived to go back with zinc at four cents, and cloth at ten cents.

Mr. Tillman.—We now produce five times as much zinc as England. Poland and other countries produce more, but we will shortly exceed any of them.

Prof. Mason.—There are two deposits in Europe, one in Silesia and the other in Belgium. These are now failing. There are also two deposits in America, one in the Bethlehem mountains, the other in Tennessee.

After some desultory remarks upon the arts of the Chinese, Japanese, etc., the Association adjourned.

Subject for next evening, "Lead."

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE, *February* 1*st*, 1860.

John Johnson, Esq., in the chair. Benjamin Garvey, Secretary pro tem.

Mr. Garvey gave an account of Ehrenberg's and Foucalt's experiments instituted to determine the fact of the earth's rotation. He also explained, by the aid of a diagram on the black-board, the construction and mode of operation of his "Gyrometer." The object of which is to render the earth's rotation visible for any length of time desired so as to determine, first, the rotation; second, its uniformity.

The apparatus consists of a fixed vertical tube supported by a frame, and a loose horizontal tube, communicating at its centre with the vertical tube, so as to give free passage to water from a reservoir above. The horizontal tube is made as straight as possible, and turns freely upon a delicate pivot at bottom and a water-tight joint above. There is a graduated scale to indicate changes of direction, and levels to fix the horizontal tube true. It depends for its action upon the fact that a current of water, flowing from a centre outwards, tends to destroy rotation.

Major Serrel found no person in France, England, or this country, who was fully satisfied of the accuracy of Foucault's experiment, and he, therefore, considers any experiment which gives absolutely reliable results as a brilliant discovery. He had tried the pendulum experiment himself, but without success: sometimes it would show rotation in one direction, at other times, in the opposite direction.

Mr. Garvey explained that when a steel wire and an iron or steel ball was used, terrestrial magnetism would be likely to affect the pendulum and cause its oscillations to take place with reference to the magnetic meridian. Also that atmospheric currents would affect it, and that if the center of measurement did not coincide with the center of gravity, or of inertia, the pendulum would be affected by the unequal resistances experienced, from the air, on the parts of the ball at each side of the center of inertia. The error from this cause would be analogous to that which takes place in the path of a ball projected from a smooth-bored cannon. If the ball of the pendulum be caused to rotate, at the same time that it oscillates, this error will be eliminated as the *aim* of a rifled gun is made certain by causing the ball to rotate as it moves along.

Mr. Seeley had tried Foucault's experiment without success. It is a delicate experiment. It seldom succeeds with any one. Mr. Garvey's experiment is also one requiring great delicacy. I do not think it will succeed. We hear of many such experiments but they don't succeed. They require a delicacy of workmanship in the apparatus that cannot be attained.

Mr. Fisher wished to get a reason for the rate of rotation indicated, for different latitudes, differing one from another. Why does not the indication always continue at fifteen degrees an hour for all latitudes? Mr. Garvey gave a popular explanation, by the aid of diagrams on the black-board, referring the difference to the fact that the indicating tube revolves on the surface of a cone, not on the flat surface of a disc.

Mr. Babcock considered that water in flowing down a vertical tube would take up a rotation of its own which would affect the instrument described.

Mr. Garvey said that this objection was well taken; that in the experiments which he had tried, he invariably found that result to be produced—hence the reason for detaching the horizontal tube from the vertical one.

Mr. Seeley introduced the regular subject of the evening.

"LEAD."

He could not find the primitive meaning of the word *lead* or *plumbum*. Lead was known in the earliest times by almost all nations as a metal, but not as a paint. The American savages used the ore as an ornament, but had never reduced it; though, if they had employed lumps of the ore about their fires, they would have obtained the metal. This is strange, seeing that they were workers of *copper*. In the time of Paracelsus, there was a *furore* for metals over all Europe. The principal deposit of America is in Davidson county, N. C. It is found in all rocks; but in the azooic rocks the galena contains a portion of silver, even seven per cent.

There are two ways of getting sulphur away from the ores of lead. 1st. By using some substance having a greater affinity for sulphur than lead has—iron for instance. 2d. By roasting the ore containing the sulphur, in contact with oxygen. In this process sulphuric acid is first formed, but by increasing the heat, the sulphur takes up two more equivalents of oxygen and sulphurous acid is the result. The roasting process is employed out west.

The English crush the ore and roast it in a reverberatory furnace, the heat being applied cautiously for a certain time, and the metallic lead being allowed to flow from the bottom of the furnace. The lead for the use of the whole world is produced in Europe and this country, a little being also produced in Mexico. Whatever silver is produced in England is obtained from the lead ores. *America* and Mexico are the only countries of the world which produce a silver ore.

Mr. Fisher asked for information on the poisons from lead water pipes.

Dr. Weatherby said that the poison proceeded from carbonic acid in the water, which uniting with the lead gave the characteristic effects of lead poison. In a recent number of the "Medical Journal" the idea of poison from lead pipes was shown to be erroneous. A certain amount of heat is necessary to form a soluble compound of lead; oxygen or carbonic acid escaping from the water in summer may combine with the lead, giving the oxyd or the carbonate, which are considered poisonous.

Mr. Seeley.—No doubt lead is a poison as well as arsenic. Persons' constitutions differ as regards poisons. So some painters have colic while others use lead with impunity. The same is the case with arsenic; the dog may not be affected by it, while the cat is. Poisons in general, however, act upon animals and plants. In a recent case in England, the animals and plants near a factory were acted upon by the poisonous fumes coming from the same. The metallic lead is not dangerous, but the oxyd is. Essential oils must be oxydized to yield an odor to have an effect upon the human frame. Lead volatilizes to some extent; hence long flues are used to collect the condensed vapor. There is a popular error that *pure* water will not act on lead. The purer the water the more likely to dissolve the lead. The Croton is pure enough to dissolve lead. Chlorine in water will form the poisonous chloride. The carbonates are not poisonous. Lead itself will not dissolve in water; no metal will; what we call a copper taste in water is not produced by solution of copper; it is a minute portion of oxyd. When carbonate of lead forms on the inside of the pipe, it protects the lead from oxydation.

Dr. Young explained that the action of lead was not inflammatory. It tended to produce palsy.

Mr. Geisenhainer wished to know if lead wire and lead straps were injurious to plants. The answer was in the negative.

Major Serrell mentioned that the U. S. expedition to the head waters of the Mississippi had discovered a vein of lead on their return from the Columbia river, and while still to the west of the Mississippi. This vein is over six miles long, from eight to twelve feet wide, and standing, like a curb-stone, from four to six feet above the general level.

In the general conversation which followed, the antidotes to lead poison were mentioned (principally sulphur and the iodides,) and the use of lead for packing joints, stanching pipes of iron, etc., were spoken of, but no striking matter of sufficient interest to report was elicited. Mr. Serrell and Mr. Selleck alluded to the fact that sulphuric acid, used in pickling iron wire and iron sheets, was found to penetrate the iron and continue attached to it, or concealed within it for a long time, and can be traced by the taste and by chemical tests.

The Association adjourned to Thursday, the 9th. Subject "Adulteration of Articles of Commerce."

American Institute, Polytechnic Association,
February 9th, 1860.

Prof. Mason, Chairman. John Johnson, Secretary, pro tem.

Prof. Mason read an elaborate report on franklinite which was referred back to the committee having that subject in charge.

Mr. Bruce was called upon to open the subject of the evening when he spoke as follows:

ADULTERATION OF FOOD.

Of flour—particularly that ground in the State and city of New York—I can with safety say that, with the exception of what are termed extra and double-extra brands, none of it can at all compare in quality with flour characterized by the same labels on the barrel, as when under State inspection officers. This is a well known fact. The New York state flour is now far inferior to what it was, and bears but a low character abroad to what it formerly did.

The only remedy I know for the correction of this evil is a return to the old mode of having state appointed inspectors, instead of, as at present, allowing flour dealers to appoint their own inspectors, with whom it is optional to give the flour inspected any character their employer may desire.

The flour ground in other states where it is subject to state inspection—particularly Virginia—bears as high a character now as it did fifty years since, and commands the highest price in our market.

In discussing the article of bread, a subject I am more familiar with, I hope I may be pardoned if, in doing so, I should display a little egotism by speaking of myself as connected with the reforms and innovations on old established customs and usages in the manufacture thereof, and when I state that before I gave up business in 1853, I was the oldest engaged therein in the city—having been engaged in business with my father in Wall street, who also had another establishment for ship-bread in Fair, now Fulton street, which is still occupied for the same business by John T.

Wilson, grandson of him to whom my father sold it, and is at present the oldest bakery in the city.

Bread must be divided into two kinds, the "leavened" and the "unleavened" or loaf bread, and ship bread or biscuit, which includes small crackers, as usually termed.

I will commence with the "leavened" or loaf bread, and state that before the war of 1812, it was *raised* by yeast obtained from breweries, and, although sometimes from unknown causes it failed to produce the desired effect of lightness, yet I never knew of an instance of having sour bread with it.

Soon after the war, a Scotchman introduced a mode of making yeast, which secret was sold to a baker who supplied the bakers for some years with yeast made with hops and malt, which proved both certain and sure, but required care to prevent an excess of fermentation causing it to sour. At last, however, the secret leaked out, and bakers have since made their own yeast.

At the above mentioned time, the loaf bread with which the people were supplied, was subject to inspection as to weight and quality, and, if found wanting, was condemned and sent to the poorhouse, subjecting the baker to ten cents fine on each loaf, besides the loss of the bread. The bakers at the time were every Saturday supplied by the inspectors with a printed tariff of weight the bread should be for the subsequent week; being regulated by the corporation each week, according to the price of flour ground in this state. This was a great advantage to the bakers—because scarcely any of this state flour was used in the manufacture of loaf bread, as it did not contain sufficient gluten to take up the quantity of water that southern flour would to make a large loaf out of a small quantity of flour. For instance, the corporation notice to the bakers was based upon the barrel of flour ground in this state turning out two hundred and fifty pounds of baked bread, which it would about do; but, by using Virginia flour, the yield would be about twelve pounds more—the excess of profit accruing from the sale of water.

It may be new to some of the younger members of this Club, if I here refer to the unparalleled rapid growth of this city. Soon after the war of 1812, I occupied premises running through from the Bowery to Third Avenue—then newly cut through—and, strange to say, those premises were on the spot directly beneath where I now stand. At that time there were but two others engaged in baking all the bread required for the whole island above this spot, and neither of us were troubled with an excess of business.

To conclude my remarks on leavened or loaf bread, I can, from long experience, say with truth, that I never knew a baker, for profit, put any article in his bread to adulterate it. But I have heard that, of late years, it is a common practice to use potatoes for such purpose, and I will state its effect: When bread made in this way becomes stale, on breaking the loaf apart, it will draw out in strings like india rubber, exhaling an odor that resembles anything but roses. This is particularly so in summer.

The cities of New York and Brooklyn are, with but slight exceptions, supplied with bread, of what I consider a most health-destroying quality, and have been for a long time past; but the cause is not at all attributable to the bad quality of the flour from which it is made, but to the ignorance and carelessness of its bakers. First, in using yeast that is already sour, and from which sweet bread can never be made; and, secondly, by an excess of fermentation allowing the dough to become sour before being baked. But chief of all its faults is being little more than half baked, from which arise many diseases of the stomach and bowels. This half baked, sour dough, commences another fermentation in the stomach and furnishes ample business for physicians. I have tried all the bakers' bread in Williamsburgh, where I have resided for several years, and have found but one from whom I can obtain anything approaching to sweet bread. But as the same fault in the baking applies to his, I have prevailed on him to leave mine in his oven till thoroughly baked. By this means, I escape the evils many have to endure.

The next subject to discuss is that of "Unleavend Bread or Biscuit," commonly termed ship-bread, a much greater innovation, or, with more propriety, I might say revolution in the mode and means of its production, attributable to the introduction of machinery, by which it is now altogether produced and its quality greatly improved. Without wronging any one, I can justly claim the credit of being the original inventor of the first successful machinery for this purpose.

At one of my exhibitions at the American Institute Fair, in 1836, a committee was appointed to see how soon biscuit could be produced from wheat in the sheaf. The feat was performed in the short time of ten minutes, as the books of the Institute will show.

It is a singular fact, notwithstanding our greatly increased commerce and shipping, that there are at this time fewer men engaged in that business than there was fifty years ago. This is attributable to men of large capital having engaged in the business, from other professions, by which all others less favored are now excluded, so much the case throughout the United States. In the ship-bread business there is more opportunity, for those so disposed, to adulterate than in the other; but I know of no article that could be used for such purpose with profit that could escape detection by the first one tasting it. Besides, if plaster of Paris, or any such substance, even Indian meal, however finely ground, its tendency would be to render the dough, before elastic, to be like clay, and to render the bread made from it like slates when baked, and thus made altogether unfit for use.

There is still another article of bread that partakes of both the leavened and unleavened; this is what is termed soda-biscuit, but which are as innocent of containing soda as they are of containing sugar, unless pearl-ash is entitled to that term.

It may not prove uninteresting to the members to learn the history and origin of soda-biscuit. It is this: "A baker in Medford, Massachusetts, overstaying his time out from his business, on his return found his bread-sponge had become sour. In the hope of rendering it of some value, and not a dead loss, as it otherwise would be, he added some pearl-ash to neutralize the acid. and using some shortening he made it up in the form of biscuit, which sold well, and he continued the manufacture under the name of Medford biscuit. The Boston bakers got hold of the secret and continue the manufacture."

Soda-biscuit, so termed, were first made by Ephraim Treadwell, in this city, from the same kind of dough the original Medford biscuit was made from.

Now, I will ask, can such be healthy? Dough allowed to ferment until soured, then by pearl-ash to neutralize the acid, after all the sugar the flour contained had escaped.

Large quantities of this article are made and sold in this city. Every grocery contains them; and if this and the self-raising flour, and the bread made from such is proved, upon analysis, to be destructive of health, as I believe them to be, it is time, I think, to apply a remedy to such evils.

Dr. Stevens spoke of the serious evil arising from the use of alkalies in articles of food. They tend to produce chronic inflammation of the stomach and bowels. And to the abundant use of short cake, made with saleratus, in the Southern and Western states, he attributes the general prevalence of stomach diseases.

Mr. F. C. Treadwell gave an account of his brother's and his own early experience in the production of crackers. He argued that the universal use of them, implies their healthfulness. And also gave his experience, extending over the time from 1820 to the present; during which time, he never knew of any disease traceable to the use of soda crackers.

Dr. Young corroborated, from his personal experience, Dr. Stevens' views with regard to the abuse of alkalies.

He considered the salts of potash more injurious than those of soda, and that the mechanical clogging of the stomach with fresh bread, which works into dough in the process of digestion, is an evil of greater amount, than is understood. He never uses bread unless it be two or three days old.

Dr. Stevens attributed the general palor observed in western people, to the abundant use of alkalies.

Mr. Seeley said: Though baking is one of the oldest arts, it is not well understood, at the present day. All the cereal grains are of nearly the same chemical constitution. They are composed, principally, of gluten and starch. The starch feeds the respiratory organs, while the gluten supplies muscular fibre. Now if a paste be made of flour and water, and be baked, you obtain heavy or unleavened bread, which lies solid in the stomach, and is not easily acted upon by the gastric juice. If a similar paste be made with a little yeast, we obtain a sponge, which has the same nutritive elements as the unleavened bread, but which, when baked and eaten, presents a larger surface, viz: the surface of the air-holes, or cells —to the solvent in the stomach. It, therefore, digests more easily, and is more healthful. Fermentation changes a portion of the starch to sugar and carbonic acid. The sugar is pleasant and wholesome, while the carbonic acid serves to aerate or raise the bread. In the old method of fermenting, by means of leaven, the leaven, or fermenting dough, was liable to become putrid, and highly offensive to the smell. This can hardly occur with yeast, which is, therefore, preferable.

Within the last few years, baking powders and self-raising flour have come into use; articles which cannot be taken, for many years, without injúry to the stomach, and consequent dyspepsia. Baking powders are, simply, cream of tartar and carbonate of soda; but these cannot be had pure. Dr. Churchill, of Paris, has ascertained that the effect of hypophosphate of soda, on the system, is most injurious, and this is almost constantly to be found in connection with, or resulting from, the common baking powders. Carbonate of ammonia would be better than of soda, but it cannot be got pure either.

Prof. Hedrick showed that there was a chemical change, the starch being changed into dextrine, which is more soluble and fitter for nutrition. The change, by fermentation, is from starch to dextrine, then to sugar, then to alcohol, lastly to acetic acid. The sourness then shows that the fermentation has been carried too far, and the dough has been deteriorated.

On motion, a committee of three was appointed to arrange the subject of adulteration of food, for discussion by the Club.

The Association adjourned to Thursday, the 16th instant. Subject:— "Superheated Steam."

AMERICAN INSTITUTE, POLYTECHNIC ASSOCIATION,
February 16*th*, 1860.

Prof. Mason, Chairman. John Johnson, Esq., Secretary pro tem.

The Committee on adulterations of food, reported that it was inexpedient to divide the subject into separate heads for discussion.

REPORT OF THE SPECIAL COMMITTEE ON FRANKLINITE.

Prof. C. Mason, chairman of the special committee on franklinite, read a report from which what follows is an extract.

The plants and animals of the earth were a birthday gift to the primitive men. In the reproduction of each kind they foresaw the constancy of their supplies. And as the vital kingdom supplied their wants, they were not careful to learn the changes of the mineral kingdom.

In the town of Franklin, Sussex County, N. J., within 70 miles of New York, is found the only locality of ore where the three metals of iron, manganese and zinc, known as franklinite, are molecularly combined, and either monometrically or amorphously crystallized. Its precise position, geologically, is in a belt of altered granular limestone, resting unconformable to a sienitic rock below and having sedimentary and palæozoic formations to the west of it.

As early as 1640, a party of Nassau miners discovered it, who came from New Amsterdam, N. Y., and explored the range of ores from the line of Pennsylvania to Salisbury, Conn. In 1770 it was examined by Lord Sterling and samples sent to Europe.* In 1817, it was owned by Dr. Dowler, a mineralogist. Dr. Keating and Professor Vanuxen examined it in 1819. Dr. McClure, the father of American geology, in company with Dr. Jackson and others, explored it in 1825. Dr. Jackson revisited it in 1849, accompanied by Francis Alger, of Boston. In 1850, zinc was extracted and in 1852, iron was successfully reduced from the ore. During the prosecution of the geological survey of the state, made by Dr. Rogers, he also reported upon this. In the recent survey by Dr. Kitchell, an elaborate report is given upon the ores and mines of the state and this locality.

"Franklinite was chemically analyzed first by Berthier, who found

Silica	0.280
Oxyd of iron	66.082
Oxyd of zinc	21.395
Oxyd of manganese	12.243

"The analyses of Jackson and Hayes vary a little in the proportion of the above materials, but this variation was probably due to a slight variation in the samples offered for analysis.

"Pure franklinite is a mineral of as definite a constitution as water. A careful comparison of the analysis and of the mineral with various isomorphous compounds, gives us the formula, $(FeO,ZnO)+(Fe_2O_3,Mn_2O_3)$ as exactly representing the composition of franklinite.

"In the smelting operation, then, as the condition of the high temperature of the alloy with the excess of oxygen is found, the proportion of manganese will be materially diminished. In short, analyses of franklinite pig show an average decrease of about seven-eighths of the manganese. The amount of loss it is evident, in practical operations would vary within pretty wide limits.

"The franklinite pig metal, as ordinarily produced, should be regarded as an alloy of iron with manganese. It deserves this distinction as well from its peculiar properties as its chemical composition. It is more fusible, less oxydable, harder and of a lighter color than either iron or manganese. For many of the purposes for which ordinary cast iron is used, this compound is impracticable; while, for certain specific uses, the franklinite pig is better fitted than any other known material. We have in this alloy a new raw material for the industrial arts. Its sources are exclusively American; science and American industry should work out the problem of its application."

The bad qualities of some kinds of iron ore now in use are occasioned by

* Dr. Archibald Bruce examined the red oxide of zinc about 1810, and visited the mines in company with Col. George Gibbs.

the introduction of impurities at the time of aggregation of the ores in the common mass, having a predominant and violent affinity for iron. These impurities are such as resist all the remedies applied in the hot blast furnace and puddle, and adhere to the pig and the bar, rendering them unreliable in uses where the greatest tenacity, durability, resistance, and fineness of texture are required. They baffled the skill of iron masters and tried the patience of blacksmiths, until a recent date, when chemical suggestion or empirical trials or both discovered that the remedy for impure iron was to be found in iron ores themselves.

To make a complete description of the impurity of iron, and a directory for the application of the remedies, is a task which must be referred to the future laboratory of the American Institute, or of the national school of mines. But even if this good work were done, the owners of the impure iron might not be always ready to apply the remedy.

The maker of the pillars for the Lawrence factory knew that his customer wanted impure iron. The maker of the rail which broke on the Erie road knew that his customer wanted cheap iron, and, in the trade, cheap is another name for impure iron. The medicine is dear. The diseased iron will fill the contract.

Every iron of English ore wants the remedial ores of Norway, New York or New Jersey. When the owner of the New Jersey remedial ore offered it to a great iron maker in England, the maker of bad iron replied: "I make the worst iron in the world; my father did so before me; my children will do so after me; and we get our price for all we can make. Our ores will make none but bad iron. If we mix your rich ores and make good iron, you may fail to supply us, and then our good name may ruin us. We will make bad iron and keep our independence." And so the bad iron of England is laid on our railroads, and paid for in bonds of as little value. while the actual receipts of the road go to pay for broken limbs.

But the good time of applied science is coming. It is well understood in this country, that no iron maker can succeed without some mixture of the remedial ores with the ores diseased by sulphur, phosphorus and arsenic.

The ores of the Adirondack and the Hudson river are carried to the furnaces of Pittsburgh. The ruinous cost of accidents is teaching a salutary lesson to owners of buildings, engines and railroads. The required strength of iron (for many purposes) is obtained in bolts, beams and sheets, diminished in weight as they rise in quality; and, therefore, the best iron is found to be the most economical at first cost. The clear and decided tendency in this country is towards the improvement of iron, by applying the best ores to cure the defects of the inferior.

Precisely at this point in the history of iron, and for this specific office of curing the defects of inferior iron, the franklinite has pushed its way into notice.

The franklinite ore was deemed intractable until 1852, when it was reduced with anthracite coal at the furnace in Stanhope. From that time the ore, the pig, and the bar have been the subjects of unnumbered experiments.

Turn back to Berthier's analyses of the ore, and it is obvious that the blast furnace has not one of the impurities of other ores to carry off, except one-quarter of one per cent of silica. And the zinc and manganese, in passing off, are able to carry with them the sulphur and phosphorus from impure ores mixed in the same furnace. The reports of numerous experiments through the last eight years, and in different countries, show that franklinite ore can purify from four to ten times its own weight of other ores. Experiments equally extensive leave no doubts that from ten to twenty per cent. of franklinite pig in a puddle of red-short and cold-short pigs remove the phosphorus and other impurities on which their bad qualities depend.

Beyond all question the franklinite ore and the franklinite pig iron are the specific remedies for the impurities of all other irons; and, as such, they will be found new and great economies in the production of iron. The same ships which fetch us Scotch pig at twenty dollars a ton, carry back franklinite pig at thirty-five dollars.

The next point to be noticed is, that the portion of manganese in the franklinite pig renders it the hardest of all iron, while the passing off of that manganese in the puddle, carrying all other impurities, leaves the franklinite bar extremely tenacious.

In accordance with the last conclusion is the certificate from the testing office of France, that the bar of franklinite sent there endured a greater strain than any other bar ever tested at that place. Similar returns came from other places. The comparative value of one kind of iron, which is more tenacious than any other in our country, needs no illustration. The only question of importance in this connection may be answered by saying that the supply is practically inexhaustible.

The hardness of the pig metal, and some other qualities found in it, have recently led to multiplied experiments with some very remarkable results.

One of these qualities is the low point at which the pig melts. This point is so low that the franklinite pig, in the same fire with other cast or rolled iron, flows over the latter and fuses inseparably into the unmelted plate of cast or rolled iron; so that one side will be a plate of tenacious, infrangible iron, and the other side harder than the best drills, files and chisels. The patent for this process is already appropriated by one of our members (Mr. Butler, of the firm of Valentine & Butler), who is applying it to safes for the special amusement of burglars. But the possible applications of this process are without number. The franklinite pig crumbles under the hammer, and easily grinds down to powder, which is already displacing emery in the coarse work of polishing iron. An experiment has just been made at the furnace of the Messrs. Cornell, of this city, to illustrate the use of water in smelting metals, as proposed by Mr. Pomeroy.

The furnace was charged with 500 pounds of Scotch pig, 500 pounds of scrap, 500 pounds of franklinite ore and 1,000 pounds of coal. In twenty-one minutes from the introduction of the heat, the metal began to flow, and presented a very pure and limpid appearance, though covered by scoria of an unusual depth in the ladles. The metal when cool was much more uniform than that ordinarily produced, and bore a strain equal to good gun-metal. Your committee are, however, of the opinion that these investigations have not yet been carried to a sufficient length to warrant them in saying much about them, while as they indicate the possibility, if not the certainty, of success, the hope is entertained that they may prove so remunerative as to be prosecuted.

C. MASON,
EDWARD W. SERRELL,
S. D. TILLMAN,
R. P. STEVENS,
CHARLES A. SEELEY.
Special Committee.

WIARD'S ICE-BOAT.

The committee appointed to visit Wiard's Ice-boat, made the following report:

Mr. President.—The committee appointed to visit Wiard's Ice-boat, "the Lady Franklin," at the North Point Foundry, Jersey City, respectfully report that, at two o'clock, P. M., on Tuesday, the 14th inst., six of the members (viz., Messrs. Johnson, Seeley, Fisher, Cohen, Stuart and Garvey), proceeded to Jersey City and devoted the afternoon to a very careful examination of the Lady Franklin. Two other members of the committee, viz., Prof. Hedrick and Major Serrell, have also examined it more at their leisure, and we unhesitatingly report that we believe Mr. Wiard's theory of locomotion over ice, by means of steam, to be perfectly feasible, his devices masterly, and his knowledge and skill as an inventor adequate to meet all and every difficulty that may arise in the practical trials of his boat. Also that the boat now completing, the Lady Franklin, is a perfect model of compactness, lightness and strength. The body of the boat is composed of sixteenth inch iron strengthened by two inch angle irons, with extra framing in the rear to support the engine and fuel. The cabin is capable of accommodating twenty passengers, is eight feet in height, and is supplied with double windows, to insure warmth and freedom from frosted windows. The cabin is heated by the exhaust steam from the engine, and both it and the outside of the boat are decorated in a most artistic manner, the aid of photography being called in to adorn the panels over the windows with portraits of many distinguished ladies and gentlemen. In other particulars the boat does not differ essentially, except in dimensions, from the model exhibited at the fair, and which the members of the club have repeatedly examined.

In conclusion, the committee would state as their reason for so emphatically endorsing Wiard's ice boat, that they have given it a very careful examination, and have presented all kinds of difficulties to Mr. Wiard, every one of which he had already anticipated, and had met more completely than the committee had thought it possible; and further, that they believe it to be the direct office of this club to examine such an invention, and state beforehand, from the scientific principles and mechanical devices involved in it, whether it will succeed or not. It would argue extreme want of confidence in our own knowledge and scientific attainments, were we to hesitate to pronounce an opinion until the ice boat had been running for a year or two; then any one could tell that it would succeed. Now is the time for this club to show its confidence in its ability to judge of the practicability of ice navigation by steam.

Signed on behalf of the committee by

BENJAMIN GARVEY.

The subject of the evening, "Superheated Steam," being called up, Mr. Churchill read a paper, a copy of which was not furnished for publication.

The Association adjourned to Thursday, subject "Superheated Steam."

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE,
February 23d, 1860.

Prof. Mason, Chairman. John Johnson, Esq., Secretary pro tem.

Mr. Lewis Masquerier exhibited a chart, illustrative of, and read a paper upon, the alphabetic sounds, and the importance of a "perfect alphabet," which he claims to have devised.

Prof. Reuben read a communication from Mortara & Co., on their mode of "Braking up a Railroad Train, by the Direct Action of Steam upon the Brakes."

WYKOFF'S PROCESS OF EXTRACTING GOLD.

The committee, to whom was referred Mr. J. N. Wykoff's system for separating gold from tailings and stampings, respectfully report—

"That they have had two interviews with Mr. Wykoff, and learn from him that he and his associates, have diligently and perseveringly worked out a very simple, ingenious and inexpensive method of gathering up the infinitesmal particles of gold, which have hitherto escaped the observation of close seekers after the precious metal. The method, adopted by these gentlemen, is of ready comprehension, feasible and practicable, even to the uninitiated. Your committee, in view of the foregoing, have much pleasure in recommending to the notice of all, requiring simple and efficient machinery for washing and collecting gold, to commence themselves, as your committee have done, by an interview with Mr. Wykoff, personally, (or to visit the Melville Mine, Spotsylvania, Va.,) that the system practiced and patented by these gentlemen, may be seen to be simple and efficient.

"Your committee consider the reworking of the water employed, as a very valuable consideration.

"B. S. HEDRICK,
"JOHN JOHNSON."

Mr. McCarthy gave a description of an engine working with superheated steam, which he had seen in England several years since. The steam was superheated in a chamber distinct from the boiler, and was worked cutting-off at 1-62nd of the stroke, giving very great economy of fuel, and considerable mechanical effect.

Professor Hedrick stated, that the effect of superheating steam was precisely similar to that of heating air; that gases, and all vapors, follow the same general law, of increasing a definite fraction of its volume for every degree of heat added; and, that Prof. Pierce had determined, by calculation and experiment, that the same amount of heat which would raise water sufficient to form a cubic foot of steam at 212°, would give 6 cubic feet of volume increment to any volume of air, large or small, to which it may be applied. He himself had determined it to be 4 + a small decimal, not 6 cubic feet, but even this would develope immense power.

Mr. Seeley.—One cubic inch of water will form one cubic foot of steam at 210°. Now, a gas expands by heat one 500th of its volume for each degree; therefore, if you heat a quantity of gas from zero to 500°, you double its volume. But water at 212° boils, and you put 1000° more heat into it, and only convert it into steam of atmospheric pressure; yet that much heat communicated to a gas would treble its volume.

Mr. Garvey said that method of calculating was not correct, for it ignored the increase upon the increment; in fact the compound interest.

Mr. Fisher read a paper descriptive of the structure of the "Prosser boiler," for generating steam. He considered it defective, and not able to give the economy of fuel, which it is reasonable to expect from a well constructed boiler.

Prof. Reuben said that the mechanical effects of heat, as produced in steam or air engines, are due to the difference of temperature between the steam or air entering the cylinder, and that leaving it; and in the best Cornish engines that is only 1-14th of the heat which the fuel can produce.

Mr. Larned regretted that the most of the matter brought forward was not of a definite and accurate kind. He hoped to come to the club to get information; but, with the exception of the remarks of one or two, the information given was too loose and indefinite. Allusion had been made to the Prosser boiler, and as he was the owner of the patent, he could give his experience of it, which was ample. In using it he had tried it in every form, and some defects, which were found at first, were readily obviated, and now he found it a thorough, good and reliable boiler.

Major Serrell made some remarks upon the relative economy of high and low pressure engines, as used respectively in locomotives and on steamers, and decided that the railroad locomotive gave a much greater amount of force for the same consumption of fuel.

Mr. Dibbin joined issue with Major Serrell, on the quantities of fuel burned, and the distances run by the steamers instanced, and agreed to ascertain the most reliable data for next evening.

The Association adjourned to Wednesday.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE, *February* 29, 1860.

R. P. Stevens, M. D., Chairman. John Johnson, Esq., Secretary pro tem.

Mr. Babcock gave an account of a case of the deterioration of cast iron, which he could not account for; and he wished any gentleman present to give any information upon similar instances which may have come under his observation, or for which he had any feasible theory.

The Mystic Co., at Mystic, Conn., have an engine of fifty nominal horse power using a long slide-valve, and having a vertical bonnet, packed with vulcanized rubber. This bonnet was found, after three years use, to have been so deteriorated in quality that the iron was like black-lead and could be cut with a knife. Both the bonnet and steam-chest were removed, and were replaced by others made of iron of a different kind, yet the same result followed after sufficient use. There was a manifest connection between the oil and the deterioration of the iron, for the latter was found to occur near the oil cup, and at the back of the slide-valve. The oil generally used was pure sperm oil, but lard, coal and tallow oil have been used and all with the same effect. The water used is the spring water of Mystic, which is remarkably soft and deposits no scale. The steam is superheated now about fifty degrees Fahrenheit above the point of generation, and the pressure is about sixty pounds on the inch. The deterioration of the iron does not depend upon the superheating of the steam, for at first the steam used in this engine was not superheated. Further, the working parts—the valve face and the cylinder—have not been affected. These are found to be in good condition after five years' use. There were no observations on the steam pipes, so that we cannot say whether it was due solely to the steam, or solely to the oil, or to electric action. The steam-chest was fourteen inches by thirty inches, and though the iron was changed, the bulk continued the same, and it was deteriorated half an inch deep. The thickness of the iron was one inch.

Mr. Dibbin suggested that the action must be due solely to the oil, or there would be corresponding action in the pipes.

Mr. McCarty said the same is observed of iron resting in oil, or with oil upon it.

Mr. Howe.—To form plumbago, there must be more carbon added to the iron. This it must get from the oil, as it could not get it from the steam; and the fact that the action is found near the oil shows such to be the case.

Dr. Stevens alluded to the fact that oils are purified by the aid of sulphuric acid, which leaves some traces in the oil. This would act upon both the iron of the bonnet and upon the sulphur of the packing.

Mr. Selleck gave an account of the manufacture of boiler plates, in which he insisted upon the necessity of thorough care, as *scrap* or even *soapstone* is liable to get among the billets or blooms, to be rolled or hammered. In this way slag also gets worked up, and though the iron may seem all right at the edges, towards the centre the plate will be weak and rotten.

When the subject of the evening was called up, there were two or three members ready to give their views, which, however, added nothing to the information already possessed on the subject.

Mr. Babcock gave an interesting account of Stillman & Webster's mode of superheating, which is now employed at the Mystic Co. Works. There is a superheating chamber, which receives the products of combustion directly from the furnace. This chamber is twelve feet long. There are 120 tubes one and one-half inch diameter, making in all 125 feet. Through these pipes the steam passes to be superheated. The best and most important part of the arrangement is the "thermostat," by means of which the degree of superheating is automatically determined. It consists of a vessel of water with a diaphragm dividing it into two parts; one being connected with the boiler, the other with the superheating chamber. The diaphragm is connected with a lever, which can be so weighted as to determine the exact amount of superheating, by controlling the damper governing the amount of heated gases admitted into the chamber. It has been found to regulate within two degrees, and never has exceeded a variation of ten degrees.

Mr. Larned remarked that, from the data given, it was evident that the percentage of heating surface (about forty feet in 600 feet), which was given by the superheating tubes, was far less than the percentage of power (about twenty-five per cent.) gained.

Mr. Melrose gave his experience of locomotives, using superheated steam, in which the extreme dryness caused the parts to wear out rapidly.

The Association adjourned to Thursday, the 8th inst.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE, *March 8th*, 1860.

Professor Mason, Chairman. John Johnson, Esq., Secretary pro tem.

The Chairman asked Mr. Hills to come forward and introduce the subject of "Steam Heating." The gentleman declined speaking at that moment, but would bring it before the club at their next meeting.

The Chairman said that the subject was

"ADULTERATION OF FOOD AND DRINKS."

Mr. Bruce read a piece taken from the Tribune, relating to Dr. Hiram Cox, and his lectures on the liquors.

These liquors were described as the principal cause of insanity, and as not containing more than seventeen per cent of alcohol—the balance being water, strengthened by sulphuric acid, nitric and prussic acid, nux vomica, Guinea pepper, and other deadly poisons, one pint of which would kill any man.

Dr. Stevens read a short paper, which he did not profess to render scientific, but he vouched for the statements it contained, as embodying facts by his own experience. He stated that sugar was adulterated with Westchester county marble; coffee with burnt beans; tea had old tea leaves from Water street, and clover leaves from hay mixed with it. The old story of the Methodist telling his shop-man to sand the sugar, water the liquor, sweep the floor, etc., and then come to prayers, was literally true.

Mr. Butler wished that some easily applied tests could be devised by the club, which people could apply themselves, to determine the genuineness of articles of food.

Dr. Young suggested the propriety of adulterating intoxicating liquors until no one dare use them. He held that badly baked bread was the cause of dyspepsia, and that that was the cause of all our diseases, and would ultimately exterminate the Anglo-Saxon race.

Mr. Dibbin believed that people would use articles which they knew were adulterated. They now use coffee, tea, etc., knowing them to be adulterated. He also advocated the use of whole flour bread, mush, and oatmeal pottage, as being nearer to the natural state of the articles of food. As a method of adulterating flour, he mentioned bean flour as being used, and stated it to be a fact, that in parts of England flour cannot be sold unless it contains some bean flour. In using Indian meal, to mix with wheat flour for bread, the meal is boiled, dried, and ground again to make it smooth.

Dr. Gould remarked upon the extremely unhealthy state in which animals are slaughtered for food. They are generally in a fever from the excitement of traveling, and from the brutal usage they receive. Having been in a perfectly quiet state, and being then hurried on a journey of 500 to 1,000 miles, their nervous system is disturbed, and fever is induced; consequently the luxurious animal food used in cities is highly poisonous. In his own experience he found an almost total abstinence from animal food conduces greatly to his health and happiness.

Mr. Worthing explained his mode of making brown bread, a loaf of which he exhibited, which was tasted by several. The ingredients used were salt, water, yeast, rye and Indian meal, and it was baked for twelve hours. He further stated that he could make white bread from very dark flour, by using oil of vitriol and potash, or a tolerably white bread by using cream of tartar and soda. Oil of vitriol is commonly used in making sponge cracker. If the sponge be sour, a little alkali corrects that. The acid and alkali render it white, but not near so sweet.

The yeast is made with hops and malt. The hops are boiled and the malt is steeped in the liquor until it ferments. This yeast will keep for months. It has been taken to South America and retained its sweetness after the voyage. It must be warmed in cold weather before using it. The quantity requisite is only a teaspoonful for any quantity of flour. Mix it with a small quantity of flour and water, first stirring them together. When they are fermented add flour, and continue to add flour as often as the sponge goes in, until there is sponge enough. Care must be taken to work in the fresh flour, stirring all well up. This is precisely the same as adding fresh fuel to the fire; so long as fresh fuel is added, so long will the fire burn; and so long as fresh flour is added, so long will fresh fermentation go on. A thousand barrels of flour might thus be fermented by one teaspoonful of yeast. I have known eight barrels to be done so.

Dr. Reuben.—Sulphuric acid is sometimes taken as a tonic or stomachic, or blood purifier. It may then be sometimes beneficial when administered, though that ought not to be done by the baker. Blue vitriol and alum are worse ingredients in bread to whiten it. It is importont to consider whether yeast is the best article for raising bread. Whether it is advisable to introduce ferments of any kind into the stomoch. There are several ferments in the gastric juice. In the fermentation of bread, carbonic acid and alcohol are formed at the expense of the sugar of the bread. The starch is converted into sugar, and that into carbonic acid and alcohol. By continuing the operation, lactic or acetic acid is formed, when the bread becomes sour. The yeast plant, or fungus, grows by decomposing the flour. Therefore, we should use food in its natural state, for that is its best state. The yeast plant always accompanies fermentation, and experiments in France show that these fungi, or plants, have shown signs of vitality after enduring 212° of temperature. Pure hydrochloric acid and pure bicarbonate of soda, when united, give carbonic acid and common salt as the result. Cooks should learn to use these.

Adulterations must be practised very extensively, for the prices paid for many articles would not be enough for the genuine article. Poor flour is adulterated with alum, chalk, plaster of Paris, whiting, etc.

Animal food from beasts in a feverish state, must be a great and unavoidable evil in cities. There are three methods proposed for forwarding the flesh of animals slaughtered at a distance from the markets. In Cincinnati the flesh is put in cans, which are sealed to prevent the access of air. In Liverpool it is also put up in cans. A gas is also introduced, which neutralizes the oxygen of the air which is in it, so that it will keep for any length of time. The third plan is that of sending the carcasses in ice-cars to market. When these improvements become common, the offal can remain to manure the land—not pollute the streets and rivers.

Dr. Arthur H. Hassell, the Microscropic Analyst, exposed the adulterations and poisons in food, and the London dealers prosecuted him, but friends upheld him and he triumphed. There should be inspectorships of food established to insure the sale of genuine articles—or, better still, people should buy all things in the whole state, lest for the coffee-berry they should get bread. Nine-tenths of the drinks are concocted. The amount of port wine consumed is ten times as much as the whole district of Oporto produces. We ought to awaken attention to the fact that we are consuming poisons, and are degenerating. Old Cornaro, at the age of 40, threw off his habits and lived to be 100.

Mr. Seeley.—Bogus things are not always deleterious. Mr. Bruce's paper has internal evidence of not being true. The aroma of the native liquor is more poisonous than the drugs used as a substitute. One drop of it mixed with sulphuric acid would give a headache to all here. Factitious liquors are the best. Alcohol at 75 cents a gallon will make brandy. One gallon will make two of brandy, by adding to it a gallon of water, with a little tincture of kino to give flavor, fusel oil for aroma and burnt sugar for color. This will be as good as real brandy, or a little better.

There are two ways to correct the evil of adulteration—by having inspectors and by informing the public. This club can be of much influence. In visiting a saleratus factory recently, I found the people to understand saleratus to be supercarbonate of soda. It formerly was supercarbonate of potash. The men lived and worked in a cloud of saleratus dust, but yet enjoyed excellent health. I concluded that the action of the soda was different from that of the potash. Alkalies are generally injurious, preventing the action of the blood upon the fibrin of the muscles. Saleratus is used with cream of tartar, to make bread. In England they use tartaric acid with it. These leave tartrate of soda and potash in the bread. Saleratus is not genuine, and yet the manufacturers are innocent. They sell salsoda or carbonate of soda in its place, and this gives only half as much carbonic acid, which is the valuable ingredient, and it takes up sixty-two per cent. of water.

Mr. Smith called attention to Blanchard's mill and his theory of working flour.

Mr. Fisher gave an account of a method of making bread, which he saw at the Jersey City Locomotive Works. Common soda water was forced, under pressure, into the flour, and the whole was worked into a dough by a screw propeller and was ultimately discharged through a hole where it expanded as the cylinder came out. This was cut into lengths suitable to form loaves, which were then baked in the usual way. The bread was light and apparently good.

The Association adjourned, after appointing the same subject for the next evening's discussion.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE,
March 15*th*, 1860.

Prof. Mason in the chair. Mr. John Johnson, Secretary.

On calling the meeting to order, Professor Mason invited Mr. L. M. Hills to come forward and read a paper explanatory of the system of warming and ventilation by means of low pressure steam, practised by the New York Steam Heating Company, of No. 442 Broadway. The scope of the paper seemed to be, first, to demonstrate the entire sufficiency of low pressure steam to warm, in an agreeable, safe and economical manner, buildings of all kinds; second, to prove that the form of apparatus employed by the Steam Heating Company is the best form yet devised; third, to contrast steam heating with hot air heating, on sanitary grounds. The positions taken by Mr. Hills were well sustained.

Mr. Fisher said there could be no doubt that a large surface moderately heated, was far better for health, comfort and safety, than a small surface highly heated, as in hot air heating. Ventilation is perfectly practicable with the system of heating described, and heat can be conveyed by means of steam to any reasonable distance. Jacob Perkins said he could heat an entire parish in this way. Mr. Fisher had no doubt that a whole block could be heated by one boiler. Heating by steam was introduced into the British Museum in consequence of the injury and danger incurred by using hot air. Valuable works of art would be soon destroyed had hot air been employed.

Mr. Howe then introduced some very extraordinary specimens of leather madé from the skin of the white whale, or the white porpoise, as it is called by the French Canadians. He referred to the extreme strength and elasticity of the leather, and read a paper from Mr. Tetu, who carries on the fisheries of this animal in Canada, the substance of which we give below.

THE WHITE WHALE OF THE ST. LAWRENCE.

I propose, in this paper, to present a few facts in relation to the white whale of the St. Lawrence, one of which is now on exhibition in New York. In addition to this exposé, I will give cheerfully any verbal explanation that may prove of interest to the scientific and industrial world.

The name given to this fish by the French Canadians is that of the white porpoise, but it is denominated the white whale in all works of natural history that I have consulted.

We find the white whale in the St. Lawrence river, opposite the village of St. Roch situated nearly sixty miles below Quebec, and as far down as Father's point, a distance of about two hundred miles, It is also found in immense quantities in the rivers emptying into Hudson's Bay.

This cetaceous animal became, soon after the discovery of Canada, an article of commerce which entitled the first colonists who engaged in catching it, to a special protection on the part of the French government.

In 1707 there were no less than eight companies established at different points of the river, for carrying on this business, whom the Intendants protected by their edicts and ordinances.

The oil of the white whale was then worth only a franc a gallon; its skin was somehow considered of little value, but the facility with which it was taken was so great, that the quantity alone sufficed to make it sought after, and to render the pursuit profitable to those engaged in it, among whom a company of six farmers, at River Ouelle point, was particularly distinguished.

During the year 1710 this company took 800; some years later it killed thousands, but the numbers gradually diminished every year, and whether from the more frequent navigation of the river proving a cause of alarm to this valuable fish, or from some of those hidden causes which the depths of the ocean vail from us, they ceased to live together in large shoals, and dispersed into all parts of the river. It cannot, however, be said that they are now less numerous in the St. Lawrence than heretofore; on the contrary, their number is much greater, and their species belong exclusively to the St. Lawrence river. It is the largest and most profitable of those which live permanently in our waters.

This fish was formerly taken in inclosures, made of light and flexible poles fixed in the beach.

Stakes are now used to make the inclosures only at Rivière Ouelle, Ste. Anne's and Isle aux Coudres; but, for some years past, another method has been adopted, and, no doubt, if it had been on a more extended scale it would have yielded immense profits.

I have, for several years past, adopted the system of taking this fish in nets, near the river Saguenay.

After repeated experiments we discovered the proper manner to clarify the oil of the fish, and to manufacture leather out of its skin.

This oil is extremely fluid, inodorous, and gives a light whose brilliancy is only surpassed by that of gas. It is superior to any other for the use of light-houses, because it does not coagulate even in the most intense cold, and its ductility renders it invaluable for greasing leather and also machinery, which it preserves from injury by friction. Appreciated for these qualities by the great exhibitions of Paris and London, of Canada and New York, it has gained testimonials and medals which sufficiently attest the great success obtained.

The skin of this fish is of a tissue the exact character of which it would be difficult to establish when we have ten or twelve samples of different kinds of leather made from the same skin, in its normal state; kid, sole leather, harness leather, velvet leather, plush leather and black leather for foot gears.

The average price of a white whale which was only forty dollars ten years ago is now over $150, and this is on account of the increased value we have given to its oil and to its skin.

Its weight is about 2,500 lbs.; the largest attain 5,000, and are worth $200. These are about twenty-two feet long and fifteen feet in circumference. The ear is so small that only connoisseurs can find it, but the sense of hearing is more acute than that of any fish of the whale kind.

There cannot be any doubt that at an early day, the various properties of this animal, as yet very little known, will call the attention of your merchants and the investigations of your savants.

Mr. Garabanti showed a model of a window with the sashes so hung that both can be opened by turning on horizontal axes at their middles, thereby allowing perfect ventilation through the whole aperture of the window. By the same contrivance they can be turned outside-in for the convenience of cleaning them. At all other times the sashes are under the same control as ordinary ones. They can be raised and lowered in the same way, being hung by sash weights. This was highly commended by the Club. Mr. Fry, dentist, of Brooklyn, is the fortunate inventor.

The chairman, in calling up the subject of the evening, "adulterations," urged the importance of the subject in its bearing upon public health. He would advocate the adoption of labels, specifying the article and naming the manufacturer, so that every man should be responsible for what he sold; the use of such labels to be compulsory by law.

Professor Hedrick considered it of little importance to go over the explanation of the process of fermentation, as the general explanation was known to all present, and the minutiæ upon which excellence in any manufacture depended could not be hoped for from persons having this general knowledge. It required the minute knowledge of experts. He, though understanding the theory, could not produce good wine.

Dr. Gould then read a paper on injurious articles of food. He said it is now over thirty years since I was involuntarily pressed into the ranks of the dyspeptic army. For the last six years, in particular, I have been very attentive to the laws of alimentation, and in this I have been guided more by the demonstrations of the human stomach than by the results of the chemical laboratory. If food is deleterious, either from adulterations or from unfitness otherwise, it is equally necessary that it should be attended to in one case as in the other. The greatest bane with which we have to contend is deleterious food, made so on its passage from the field to the stomach. Wheat, one of the most healthy cereals we have, has its covering carefully removed before being eaten, though indispensably necessary for the purpose of aiding the stomach in the digestion of the other portions of the berry. The use of common salt has reached an extraordinary and injurious extent, and as a condiment it is especially hurtful when it is used so inordinately as at present.

Dr. Young thought that Dr. Gould was mistaken in regard to the fact of the use of salt. He believed that the use of salt was not generally hurtful.

The President stated that Dr. Livingston had found tribes in Africa who did not use salt, who in consequence were remarkably sluggish and imbecile.

Professor Reuben.—Salt is an important subject to discuss. There are in our blood 8 parts in 1,000 of mineral matter, and half of that is salt; the other half being made up of lime, potash, iron, &c. This salt must be supplied to the system, or it will not be developed healthfully. When, therefore, it is deficient in the soil from which our food is raised, it must be supplied artificially. There is a strong analogy between the want of salt and the want of other elements in the soil. In Massachusetts there is not enough phosphorus in the soil, consequently cattle become feeble, get the rickets, until the farmers supply them with bone earth, or ground bones, which they lick up greedily, and these supply the requisite phosphorus, to enable the bones to form perfectly and strong. It is remarkable that men who use salt are more active than those who do not.

Since the subject of sand in sugar has been broached on a former occasion, I may remark that a professor in New England has found sand in maple sugar, apparently a precipitate of lime, like cream of tartar from grape sugar. This may account for some, but not for all.

Mr. Latson.—There are several native tribes, the Camanches, &c., who do not use salt, or who use so little that a small lump of rock salt serves a whole family for a year; yet, from personal experience, I can assure the gentleman he would find them remarkably lively when pursuing him, and showering arrows about his ears. It may be that they get some alkali with their food, for they cook their meat in a trough, by throwing in hot stones, to which ashes may be adhering.

Professor Hedrick.—In speaking of the remarks passed last evening, stated that as good meat as any in the world is to be found in New York.

In medical colleges we always find disease the subject of discussion; he thought it would be better for them to study health, and its conditions and examples. He did not believe in taking everything upon assertion, and especially he thought the advice of a dyspeptic on the subject of diet should be generally disregarded, for he was a standing example that his rule is not a good one.

Mr. Seeley again introduced the subject of super-carbonate of soda. The value of super-carbonate of soda in raising bread, is exactly in proportion to the carbonic acid it contains. Super-carbonate contains twice as much as sub-carbonate. Bichloride of mercury being mixed with a solution of the salt, would not affect it if it were pure carbonate of soda, but would give a colored precipitate if it were sub-carbonate. It would give an intermediate tint when the solution contained both sub and super-carbonate, being deeper, the more of the former there was in it.

Mr. Sylvester was once engaged in the manufacture of salæratus, and had tried to introduce a sample of super-carbonate—a first-rate article—but the baker, to whom he presented it, complained that it turned his bread yellow, and involved other difficulties. He believed it was difficult to always induce people to use what was best for them.

The Chairman recounted some experiments tried at his house on making bread, and the best gave a close-grained and yellowish bread from best flour.

Mr. Fisher said that the bread made at Lyons was better than any other bread he ever tasted, and it was not white.

Mr. Garbanati said the bread of Philadelphia was better than most other bread, and it was almost white. He had no objection to eating white bread, providing he was not poisoned in doing so.

Mr. Dibbin thought that the quality of bread depended very much upon the time given it to ferment. He believed that the less decomposition took place, the better the bread was.

The Chairman said, so far as his experience went, the bread was better by not being allowed a long time to ferment or rise.

Professor Reuben.—We use a deteriorated article when we use white flour. The most nutritious part of the wheat is near the bran, for there the part which forms muscle to give strength, and the oily portions to give heat, are found. Wheat is best as food when ground into meal, not flour, for then the stomach will act upon it easily. Formerly, brown bread was universally used, and, at the present day, throughout Germany, Norway and Sweden, the *schwartz brod*, or sour brown bread, is used, the lactic acid developed in it being supposed to aid the gastric-juice. When wheat meal is fermented, there is a semi-putrescent material, called cerealin, developed. This gives a rotten wood taste to brown bread. To avoid cerealin, the bran of wheat in which it is found should be got rid of.

The Camanches alluded to live upon a soil covered with alkalies, giving the barrenness which "Greeley" mentions. The abundance of alkali supplies the lack of salt.

Our bodies contain fifteen chemical elements, and if any be deficient, the body is imperfect. In like manner if any be in excess, there is disease. The materials of the body are divisible into two great classes, nitrogenous and non-nitrogenous. The food we use must, to keep us in perfect health, supply both kinds in a just proportion. It is true that plants and animals have a power of adaptability to circumstances, and this power is greatest in the most highly developed animals, yet it is limited, and, if we exceed that limit of adaptability in food, we poison ourselves. Workmen always suffer when they take into their system substances really foreign to their body. Lead, for instance, produces cholic aud paralysis in those who take it into their systems. Workmen in silvering glasses or making daguerreotype plates, suffer also from fumes of mercury. So also do persons who use Cayenne pepper adulterated with red lead, or mustard, or pickles containing it.

Mercury produces as many diseases as it is prescribed for. Phosphorus also produces diseases and whatever organ contains a foreign element, or any one in excess, must get rid of it before it becomes healthy. Whatever articles are used for food or drink, should be pure, and labels ought to be employed to enable us to trace out the original manufacturer.

Dr. Stevens thought the cattle offered for sale as beeves in this market are the best of any offered in any market in the world.

Mr. Lamb presented several specimens of spices. He said that large quantities of rotten-stone were used in the adulteration of black pepper, and the color was sometimes made too dark, and pumice-stone had then to be used to bring it back. Red lead was also used in the adulteration of red pepper, though he could not say that this was very largely the case.

The subject selected for the next evening is "The best method of conveying persons and property to and within the City of New York."

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE,
March 22*d*, 1860.

President Mason in the chair. [No secretary.]

During the time for miscellaneous business Dr. Young exhibited a specimen of proof-sheet, the object of which was to identify each compositor's work on daily papers, when copy has to be divided among several. The improvement consists in supplying each compositor's case with slugs having a raised number in the center. These are placed at the head of each portion of an article, making it easy to identify the compositors who own them. As the slips are corrected each compositer removes his slug, leaving the matter in order for the "maker up." Dr. Y. claims to have invented this ten years ago.

Mr. Bruce read a long circular from Mr. O. P. Stevens, of Cleveland, Ohio, describing his grain-hulling and feed mill, and the advantages to be derived from its use. These seem to be many and important, as it removes only the least nutritious part of the wheat, and only a small percentage of

Mr. Rowell read a communication from Mr. Prosser, in relation to his boiler, and to correct some statements made, in relation to it, by Mr. Fisher, on a former occasion:

NEW YORK, *March* 20, 1860.

Mr. Fisher, in a "paper read before the Polytechnic Club of the American Institute, February 23d," doubtless intended to do my *boiler* full justice; but, I regret to say, that he has failed to do so, and hence, I feel constrained to do it myself, lest my silence should be construed into indifference of the principles of that invention, which has cost me so many years of toil, and thousands of dollars; or, still worse, that others should be allowed to rob me of the merits of its invention.

The first boiler, of the kind referred to, was built in 1855, (after making expensive experiments at my own proper cost, charge and expense.) under my own directions, and from my *own* drawings, on principles which had, for years previous, engaged my attention and my means.

I was called upon to explain and defend it before the New York Steam Fire Engine umpires, in 1856, and no one there, but myself, dared to claim the invention; and for the truth of my assertion, I appeal to those gentlemen, viz: Messrs. William B. Leonard, Alderman Blunt, G. M. Woodward and F. S Low. Thus much, in vindication of myself from a rumor which Mr. Isherwood has suffered to *soil* his excellent "Engineering Precedents," vol. 2.

The second paragraph, of Mr. Fisher's communication, is very erroneous; and as to the comparisons with the boilers of the "San Jacinto," I entirely repudiate them as made, for reasons too obvious to need insisting upon. My boiler had been in operation nearly two years when the trials, referred to, were made—now nearly one year ago—and it is still in the same condition as it was then, although it has never been blown off, for there is nothing but clean distilled water to blow off at any time.

The evaporation, as recorded by Mr. Isherwood, exceeds 13 lbs. (more correctly, 13.048, 13.106 E, 13.072 lbs.) of water at 212° F., converted into superheated steam by one pound of combustibles for each and every one of the days to which the record refers.

This, I believe, greatly exceeds anything ever before recorded, (under the same circumstances,) having as good authority to support it, for there was no priming, and no vesicular water. Another point which challenges attention is the fact, that on the only day when the break was sufficiently effective to enable steam of anything like the proper pressure to be used, only 2.933 lbs. of combustible, or 3.317 lbs. of coal, per hour, were required to develop a horse-power. But to come to the real practical point at issue—the cost in full, per *effective* horse-power, for it matters not what the developed horse-power may be, if it cannot be developed into useful effect, but is partially used up in its own development—five pounds per square inch of initial steam pressure is sufficient, without any load upon the engine, to draw it at the speed at which it was worked on the 2d of May, which is less than five per cent of that which was used; and, therefore, we require but 3.08 lbs. of combustible, or 3.49 lbs. of coal, per hour, per *effective* horse-power, which is less than half the ordinary consumption of marine engines.

To oblige Mr. F. in regard to the "San Jacinto:" The consumption of fuel, under its best boiler, was 3.565 lbs. of combustible, or 4.827 lbs. of coal, per hour, per developed horse-power; or, 4.505 lbs. of combustible, or 6.100 lbs. of coal, per hour, per *effective* horse-power, allowing 2 of the 9.58 lbs. of the mean gross effective pressure on the piston, for working the air pump, and overcoming the friction of the engine, without any load. But I have not yet done; for when the boiler is two or three years old, its evaporative effect will be so far reduced as to require, probably, 6 lbs. of combustible, or 8 lbs. of coal, per hour, per *effective* horse-power; for the ordinary rate of evaporation, under such circumstances, scarcely exceeds, on the average, more than 6 lbs. of water, with 1 lb. of coal; while my boiler, ("only the size of a large stove," as Mr. Isherwood says,) ever remains as good and effective an evaporator as when new.

Again, ordinary boilers of sea-going steamers usually wear out in five years, while mine will, in all probability, last an age. Remember, however, that this boiler is but a mere incident, not at all necessarily connected with my system of applying and condensing steam. It is through the medium of this new system, that the economy and perfect safety of the boiler depends. It gives to the condenser a large surface, with a small capacity, in proportion to the contents of the boiler; hence, if the feed-pump should cease to act, the condenser becomes choked up with the water which should be in the boiler, and the engine is brought up long before the latter is in any danger, from deficiency of water. Thus, safety is insured. Economy in fuel is the sure result of distilled water at a high temperature; alone being supplied to the boiler.

I hope, ere long, to see another volume (3,) of "Engineering Precedents," from Mr. Isherwood,—one on surface condensers,—when, I am sure, we shall have facts elicited such as the engineering world is, at present, lamentably deficient of.

There are some points in Mr. Isherwood's remarks on my boiler with which I do not agree, and believe I can convince him of the correctness of my own views, should occasion arise to make it necessary or desirable.

For the present I will merely observe, that his statement of the absence of any combustion chamber in my boiler is a very singular and unaccountable error. Surely I have one, and the most effective portion of the steam generator hangs down like a stalactite into it, and it develops itself in a hollow, pierced slab which forms the top of the furnace. From this furnace top twenty-four tubes pass through those which are pendant in the combustion chamber, while *seventy-six* others commence and finish their course in the drum, the whole one hundred opening into the smoke connection.

By this means I am enabled to obtain such "*enormous and unusual*" proportions (as they are described by Mr. Isherwood), and, I may add, such *enormous* safety too in the superheating of the steam.

My method of effecting this universally desired object, should, one would think, be adopted by all with alacrity; but its simplicity, economy, safety and efficiency are qualities which will, for a time, prevent it; for, however paradoxical it may appear, complication and other bad qualities always obtain the predominance at first, in the physical as well as in the moral world, as has been again and again exemplified in every important invention which has benefited mankind.

But time will show that not only this, but also my method of "*applying and condensing steam*," whereby a recuperative supply of distilled water is available to make up for the boiler waste, and thereby increase the evaporation and durability thereof by preventing the possibility of scale forming therein, must eventually take the place of the present unphilosophical methods now in use. "So mote it be."

THOMAS PROSSER, A. M.

Mr. Fisher denied any intention of underraing Mr. Prosser's boiler. He considered all the statements in relation to it in the paper as strictly correct, and believed Mr. Prosser to be the inventor, though others have patented it.

Mr. Montgomery stated that he had devoted his whole life to the subject of generating steam, and had reduced all his experience into the construction of his boiler. Recently he was compelled to go into the testimony of experts, in order to get his patent renewed, and these experts, though anxious to favor other forms of boiler, were compelled to prove that only from 1 lb. to 5½ lbs. of water were converted into steam for each 1 lb. of coal in ordinary boilers, while in his they proved that 10½ lbs. were the average. The boilers of the *City of Glasgow* evaporate 2 lbs. of water for one of coal; the *Vigo*, 6 lbs.; the *Engineer*, 3½ lbs. His boiler is claimed to be the only one in which water is evaporated upon strictly chemical principles. The water receives most heat where it is hottest, and less where the water is coldest. He stated that Professor Renwick has seen the products of combustion enter the boiler at 2000° F., and leave at 140°, having parted with so much heat. With this boiler the *La Fayette* makes the voyage to Europe in 12 days, burning 12 tons of coal per day, while the *City of Glasgow* uses 40 tons of fuel per day, and takes 14 days to make the trip.

The subject of the evening being now called for,

Mr. Fisher read an able paper on steam locomotion through cities.

MR. FISHER'S PAPER.

The first requisite of a system of transportation for cities is, that it be free from dust and mud; the second is, that it be practicable for all kinds of vehicles to go wherever required; the third is, that it be capable of high speed with safety; the fourth is, that the vehicles be ventilated and warmed when desirable; the fifth is, that it be as cheap as is consistent with the general style of living and rate of expenditure of the majority of those who habitually use it. The foundation of a system of transportation is the road. But the road must be suited to the power. If we are to have horse power, the road must be so rough that the horse can have a secure foothold; if we are to use a power borne on wheels, we may make the road smooth. I shall first consider the road, assuming that the power is to be borne on wheels. Iron is admitted to be the best material, and the cheapest, where the traffic is sufficient to keep the interest on the cost relatively low.

For the thoroughfares of this city I shall consider iron the material, taking it for granted that no proof on this point will be required by the persons whom I address.

The power required for traction on iron rails, with railway wheels moving very slowly, is 3 lbs. per ton for the rolling resistance, and about the same for the friction of axles of 3 inches diameter; and for the resistance of cohesion there is one-eighth of a pound for each mile per hour, or 2 lbs. for 6 miles per hour. This is the conclusion from experiments by Harding and Scott Russell.

But the axles of light carriages do not average more than 1½ inches diameter, hence 1½ lbs. per ton would be their resistance; and the wheels of common carriages are one-half larger than railway wheels; hence the resistance would be reduced to 1 lb. per ton at the axles. Moreover, the resistance of cohesion and rolling was found by Morin to be inversely, as the diameter of the wheels; but this is disputed by others, who hold that it is inversely as the square root of the diameters. If Morin be right, these resistances would be reduced from 5 to 3⅓; and if the others be right, they would be reduced from 5 to 4.008 lbs. per ton; and the total resistance, at 6 miles per hour, would be 4⅓ lbs. in the one case, and 5 lbs. in the other.

The last figure is an eighth of the resistance which Marriote found on the Piccadilly pavement at 2½ miles per hour.

The weight of an omnibus is fully equal that of its load, but if it run on an iron floor its weight might be reduced, and hence less power could work it. The English stages on Macadam roads used to weight from 16 to 18 cwt., and sometimes carried 40 cwt., and yet lasted a long time; on an iron floor they could have been still lighter.

In Chatham Square, on the ascending line, there are iron horse tracks of a bad form, and not firmly connected to the wheel tracks. It would be better to cast the horse tracks in broad plates, as proposed by Mr. Jordan Mott, and to bolt the rails to them. Still better would it be to make the wheelways without grooves, and the wheels without flanges; the system of the Commercial Road in London, and the stone tracks around Milan and Parma.

Mr. Tillman and Mr. Montgomery have explained to this club their plans of iron pavings, designed to keep the wheels on a continuous plane, while there are indentations sufficient to give foothold for the horses.

On either of the foregoing systems of ironway, a man can do as much as two horses on good stone pavings, if the weight be suited to the road, and the road be kept clean. But the dirt usual in streets increases the resistance, probably more than doubles it. To avoid the dirt we must get rid of the horses. The key to improvement is the wheel borne power.

Steam is the best power I know of Some believe that hot air will be better, and some speculate about compressed air, electricity, and other powers or agents; they may be right, but I am not convinced of it.

Steam is objected to on several grounds. I think it but fair that objections should be proved and not merely asserted, that the evidence to maintain them should be as good as the evidence in favor of steam; but while we have evidence given under oath before parliamentary committees by such engineers as Telford, Macadam, Macneil, Farey, Field, Cubitt and others in favor of steam carriages which they had seen, men who never saw them are allowed to say that steam carriages will smoke, their wheels will slip, they cannot ascend hills, they cannot be stopped or steered with precision, they will frighten horses and run over people, etc. To such teachers it is sufficient to say, that it is impossible for coke or charcoal to smoke; that steam carriages have been up hills of one foot in six; that they can stop quicker and steer better than horses; that they seldom frighten horses and are never themselves frightened, and that the charge of their being dangerous is not proved.

But steam will have to begin upon the road made for horses and underwork them before it will have a road of its own, and a fair opportunity to show its advantages, and this it is able to do. On soft roads, which are the most difficult for it, it can work with advantage. Boydell's traction engine drew a siege-gun across a marsh where horses could not go at all, and Fawkes' engine draws plows cheaper than horses can draw them.

Mr. Latson said it was a principle his father taught him, when he did a thing to first count the cost, and when he leaped a fence to see further was there a ditch on the other side. The bane of the lower part of New York was that it was level, it would not answer. It was destructive to health, and the result of the dead level would be death. Men might live fast enough to live out their years in ten years, but he preferred not to be that man. The city could not be ventilated if level. No man going into the country for his health seeks a level country, if he knows what he is about. He seeks a hill country, gets by it two things, pure air and pure water. He thought an advantage might be derived by placing the East river steamers on the East river side above Grand street, and the North river steamers above Canal street.

Mr. Garbanati thought that Broadway was so smooth now that it was difficult to get along upon it, and if it was to be made smoother it would be difficult to get the necessary adhesion. Steam would not be introduced generally at present. He thought that the city railroad companies should be made to put a sufficient number of cars on to accommodate the travelling public. It was done in England, and might be done in this country. He thought no particular mode of transportaion could be declared the best, for under the present circumstances, and with the present prejudices, all must be used.

Mr. Montgomery finds iron pavement to be the cheapest. Stone disintegrates by alternations of heat and cold, even without wear The immense wear that iron gives is manifest, from the wearing of corks of horse-shoes and tires of wheels. Iron stands longer in a well traveled road, than on a field where it is not used. There are electric currents generated by the travel, which improve the iron by imparting to it new qualities. There is only one and one-half per cent. wear to sewer covers after thirty years use. Iron, in fact, is practically everlasting, There may be a perfect level given for wheels and yet the pavement present angles for corks to catch into and give horses foothold to prevent slipping. In his pavement there are deep grooves filled with a tough cement and fragments of stone. Cobble stone or Belgian pavement costs more than iron. For instance, iron costs $5 a yard; Russ, from $5 to $7; Belgian, from $5.25 to $2.87½. The life of these latter is about three years, with repairs. Iron lasts fifty years before its upper side is worn away, it can then be turned when it will last fifty years longer, and then the old iron will be worth ninety per cent. of its original cost, it will have so improved in quality. "We may thus have our cake and eat it."

Professor Mason.—The first iron pavement was laid in Court street, Boston. It cost five dollars per yard and is now seven years old and as good as ever.

A question having been raised as to the failure of iron pavement in Nassau street, Mr. Montgomery stated that it gave way because there happened to be the vaults belonging to the Old Church extending under the street. It was not the iron that gave way, but the substratum.

A question having also been raised as to the prices quoted above, the cost of iron pavement was stated to be six dollars and a half, while Belgian is but one dollar and a half per yard.

Mr. Garvey gave an account of a method proposed for towing railcars by means of ropes, worked by stationary engines, the cars being capable of catching on or letting go at the will of the conductor. The ropes being above the level of the side-walks and not crossing the streets, would be out of the way, but still this plan he considered far inferior to the use of independent locomotive cars.

Mr. Seeley suggested that some one should give the mathematical reasons for and against the use of compressed air as a motor within cities.

The Association adjourned to Thursday, the 29th, having determined to continue the same subject.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE, *March 29th*, 1860.

Professor Mason, Chairman. No secretary.

During the miscellaneous business hour, Mr. Merchant, of Boston, exhibited a filter formed of unoxydizable wire, corrugated and packed tight, so as to allow no solid particle to pass through. Messrs. Haskell and Garvey were appointed a committee to examine it.

Mr. Bogart, of the Metropolitan Gas-burner and Register Co., 592 Broadway, exhibited their patent burner for regulating the pressure and consumption of gas, at the very outlet. He performed quite a number of experiments, in which the value of this burner was contrasted with that of other ones.

Messrs. Seeley, Hedrick, and Garvey were appointed to examine the burner at leisure, and make a full report for publication.

Mr. W. J. Demarest exhibited some journal boxes, with a new style of friction rollers, which, he claims, give a great result in lessening friction. Major Serrell and Mr. Dibbin were appointed a committee to examine them.

The Chairman then introduced the subject of the evening, by stating that speakers must confine themselves directly to the "Carrying of freight and passengers to and from New York," because the great interest elicited by Mr. Bogart's experiments had led to devoting more than twice the usual time to miscellaneous business. He then read the following paper:

The growth of New York has always been measured by the extent of the interior for which it furnished a market. While this market was reached only by sails on the rivers, and the rivers received their freight only over common roads, the city was two hundred years in gaining a population of about sixty thousand.

The city received its first impulse of prosperity when steamboats appeared in the rivers, in 1808; but this was very small when compared with the second impulse received from the opening of the canals, in 1824.

The lands, bordering on the canals and lakes, were brought suddenly into fair comparison with the lands along the rivers, and as suddenly covered by a dense population. And this growth was, at all times, a measure of the growth of New York. The canals raised New York to the position of the Empire City of the Empire State.

As compared with the other cities of the sea-board, this city held a pre-eminence, during the period of exclusive canal movement, which she is not likely to maintain under the movement by railroads. The borders of the canals and lakes were all our own. But, in comparison with her former self, our city has been made incomparably more prosperous by the conveyance of persons and property on railroads.

That the railroad is our best mode of conveyance, for persons and property, to the city of New York, is conceded, except as to the gross and cheap products of the forest, the quarry and the mine. If the question, concerning the carriage of farm products, is still an open question as between canal and railroads, the obvious tendencies are strongly in favor of the latter. Since the railroads came into use, no canal has been built; and with our present experience, no canal would be enlarged.

Conveyance by railroad has steadily encroached on the business of the canals. Meanwhile, the State Engineer has spent his best energies in trying to convince the Legislature that the railroads were conveying property at ruinous prices; but, the insincerity and futility of these attempts is proved by the prosperity of the railroads, and the readiness of the Legislature to impose discriminating and perplexing taxes on the railroads, under the name of canal tolls. But the comparative economy, of the two modes of conveyance, is unimportant to the prosperity of New York, so long as she has both, and so long as the friends of each are left free to render each perfect. The capacity and economy of the canal will be shown when all the resources of steam power, upon the boats, have been proved. And, the possible extent and cheapness of railroad conveyance will not be ascertained, until every possible economy and improvement of the most complex and incomplete machine can be made. But, we can now see enough of the future to know that both will be cheaper, and that either can be made to perform more work than has yet been done by both.

But the true value of railroad conveyance to New York will be found in the opening of a good market for farm products, through every valley and over every fertile plain in the United States. Every breadth of twenty miles of fertile land can afford a single track railroad. The best lands of Illinois (and almost all the lands of Illinois), are now, at an average distance of not more than twelve miles from a rail track, and a rail track is a market anywhere, on this continent. For, while the value of farm products is exhausted by cartage of a short distance, it may be safely assumed, that the matured products of the cornfield, the stall and the dairy, can be brought one thousand miles by rail for about ten per cent. of the value.

The waters of our rivers, canals and lakes, brought a market, during half of the year within twelve miles of less than a twentieth part of the fertile lands of this continent; but the railroads will bring a market during the whole year within an average of five miles of every fertile farm on the continent; and the farmer will be at one end of that market, and New York at the other end. The result is not uncertain. It may be delayed by wars or by unwise legislation, but the checks will be temporary, and the end sure.

No such field of prosperous farm labor was ever before opened on this earth, and therefore, New York will rapidly become the first commercial city of the earth.

The tropical products of this continent are more various, more rich and more accessible to cool climates, than those of Asia or Africa. Our tropics will all be cultivated under a neighboring civilization, and to a large extent by machinery. Twenty millions of English capital are this year passing into one of our tropical States, and all for machinery.

The effete races of Asia and Africa will reappear in our tropics, mended in condition and character, and will share with us the various products of co-operative labor; while our own city will be the chief place for the interchange of these products. A little of our ingenuity and a little of our ice applied to cheaply built steamers, will make tropical fruits as regular and as cheap in our market, at all seasons as potatoes; and the same ingenuity and ice applied to cars will give us game from Iowa in August, in exchange for our tropical and ocean products.

The future of our children is a glorious vision. Time will remove us from their notice, but from the conscious enjoyment of this vision, and from the recollection of our own part in its production, never. Therefore we can labor cheerfully to fill the earth with knowledge. Such labor hath a peaceful solution. It clears the air of demons, and the earth of demigods and demagogues; and allies us to the Great Father who worketh all the while.

Mr. Howe.—There have been some improvements made in propellers which tend to revolutionize the whole traffic by introducing steam on canals. Two screws have been used, one on each side of the rudder, and with manifest advantage. The wagon-shaft screw has also been employed. It turns with the helm and renders steering easy and quick. There can be little doubt that the screw will supercede the paddle-wheel.

Dr. Vanderweyde.—Propellers do better at sea than paddle-wheels, because the vessels carrying them can take advantage of the wind. They have therefore superceded paddle-wheel boats for freight and have monopolized the immigrant trade.

Mr. Haskell noted the fact that two small steamers have been plying on the canals, with passengers from Buffalo to some point 30 miles westward.

Mr. Dibbin.—There is a line of steamers from here to Philadelphia, via canal, from pier No. 10, N. R. The boats carry 300 tons, travel at the rate of 6 or 8 miles an hour, and burn 6 to 7 tons of coal in the trip. These canals do not suffer restrictions on propellers. The pitch is light and the boats are shallow. The propeller mentioned by Mr. Garvey (Montgomery's), is an excellent one, the sheath effectually protecting the banks from injury. The railroad charges once and a half as much for freight to Philadelphia as the canals. The Erie, the Central, and the Harlem roads carry freight for far less than what would pay, in order to break down the canals. The carrying of 300 tons to Philadelphia would cost, with wood, from $80 to $90; with coal, about one third on canals, or one half on railroad.

The Chairman.—We should be cautious about making statements concerning railroad managers. They are generally men of character, who have all their fortunes and characters at stake. When Mr. Sloan became President of the Hudson River road, he took the cattle carrying from the boats, and found it a good business. Every car added to a train gives profit. Of the $14,000,000, which the road cost, $10,000,000 are not worn by increased movement. Therefore every increase becomes a source of profit.

Give us the freight of cattle at 30 cents a head, and we will make a profit. There is no measure to the economy of railroad traffic. In 1880 the Hudson River road will have paid all back dividends.

China is the most prosperous agricultural country of the world, because of its rivers and canals. Illinois has now no farm land more than fifteen miles from railroad. Railroads determine the value of land. Before the Rock Island road was built, an old farmer had two sections, of the nominal value of $3 an acre, 240 miles from the town. When the road was built it was worth $80 an acre. There is nothing like the progress of wealth caused by railroads. Illinois and Georgia are making them. In Poughkeepsie the receipts have steadily risen, and at a rapid rate. The strife between the boats and cars foreshadows the total destruction of the boat traffic, at least in passengers and perishable merchandize. The New York Central has power now to carry more than the boats. It can run ninety trains, and now runs only three. The sleepers, earthworks, masonry, station-houses and bodies of the cars, do not wear out with the motion. It is the rails, wheels, oil, fuel and attendance, that cost for extra traffic, so that freights can be made lower and lower every year as traffic increases.

Mr. Garvey read the following report:

COMMITTEE'S REPORT ON GOLD'S STEAM HEATING APPARATUS.

We, the undersigned, being a committee appointed by the Polytechnic Association of the American Institute, to examine Gold's Steam Heating Apparatus, respectfully report—

That the points to which we have directed our attention were, 1st, the effects of this mode of heating upon health; 2d. Its safety, or danger, as effected by liability to explosion, or the communication of fire to wood work; 3d. Economy of first cost and subsequent repairs, as well as consumption of fuel and cost of attendance; 4th. Its bearing upon the finish of a building, its architectural arrangements and furniture, &c.

First. Then we find that the heat furnished by this apparatus is given off by a large surface moderately heated, and not by a small surface intensely heated, consequently the vapor and particles of organic matter, &c., in the air, are not decomposed, the air is not burned and desiccated, but is left in its natural state, fit for supporting life and maintaining health.

Second. We find that the steam in this apparatus is used at so low a pressure, that there is no possibility of its exploding of itself, unless by accident steam of much higher pressure should be generated than that at which it is intended to operate, and we consider such an accident impossible with the arrangement of "hydraulic regulator" employed.

Third. On the score of economy of first cost, we believe this to present some admirable points. No other means is now employed for producing so large an amount of radiating surface for the same cost. Its simplicity of structure renders the call for repairs unlikely, as there is no excessive heat to burn out the parts, or to prevent their being protected from rusting by suitable paint. The fire also being entirely surrounded by water, and the access of air to the fuel being completely controlled by the temperature of the atmosphere, there seems to be a perfect economy of fuel.

Fourth. The appearance of the radiator in any apartment, can be made to harmonize with the style of architecture or of furniture, and with colors employed in decoration. And so moderate is the amount of heat given off by any part of the surface, that the most costly articles of furniture are uninjured by it.

The points of excellence which we particularly notice are, 1st, the mode of obtaining large radiating surfaces; 2d. The mode of regulating the pressure of the steam and the combustion of fuel; 3d. The absence of all necessity for attendance upon it; 4th. The freedom from risk of fire or explosion.

We do not deem it necessary to give a description of the apparatus, as it has been described on a former occasion before this association.

BENJAMIN GARVEY,
THOMAS B. HOWE,
JOHN JOHNSON,
Committee.

The association then adjourned, having continued the same subject for next night.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE,
April 4th, 1860.

Professor Mason, the Chairman, having called for communications, or exhibitions of inventions,

Mr. St. John Odoris exhibited some specimens of "Artificial Fuel," composed of seventy-five per cent. of coal dust, fifteen per cent. vegetable matter, and ten per cent. bituminous matter.

Mr. Pierson Crosby exhibited a neat model of a saw mill, with a horizontal pitman, for re-sawing lumber. The model was a neat working one, showing this to be a valuable invention.

Dr. Stevens stated that the first saw mill ever made, was in Connecticut.

Mr. Johnson stated that his own father was the first person who ever sawed laths with a circular saw.

Professor Mason considered the saw mill and the rolling mill as the two most important inventions of modern times, giving, as they do, wood and metals in suitable forms to be readily worked for the use of the farmer and mechanic.

Mr. Fisher communicated the substance of the report about to be made on the Patent Laws by the committee appointed to examine the subject.

Mr. Larned made some explanation with regard to the so-called Prosser boiler, for which he holds a patent. He considered it improper to have any personal matters brought before the Club. If any one doubted the validity of his patent, or the originality of his invention, a court of law is the only place to decide the question. The Club has no jurisdiction.

These remarks called up Mr. Fisher—but the discussion which followed was not of scientific interest.

The regular subject of the evening being called for, viz.: "Conveyance to and from the City:"

Mr. Fisher introduced it by reading a paper of some length. The requirements of a perfect system would be, first, speed: Second, freedom from dust and mud: Third, ventilation of cars. Steam on the railroad gives the first requirement—for trains with flanged wheels have made from seventy to seventy-eight miles an hour—and there was no reason why wheels without flanges should not accomplish the same speed. The steering was the great difficulty, but practice in that would give experts, as well as in any other art.

To insure freedom from mud and dust, we should have smooth iron roads over the whole country, with grass growing up to the very edge of the road, so that there should be no place for mud or dust to be accumulated. For ventilation, we must get rid of the locomotive and huge cars, carrying a whole herd of people, and come down to the use of the single locomotive steam-wagon, with its perfection of ventilation, freedom from danger, adaptability to the suburban passenger traffic, etc. The steam-wagon can make twenty to thirty miles an hour with ease and safety, can stop quickly, can turn off and leave passengers at their very doors, and possesses many advantages which adapt it peculiarly for suburban traffic and for "feeding" railroads. Ogle & Sommers, steam-carriage proprietors in England, state that they have made thirty miles an hour.

The Chairman completed the reading of the report which is printed entire in the proceedings of 29th March.

In answer to a question by the President, Mr. Dibbin stated that city rail cars have been made of from 3,000 to 4,000 lbs. weight.

Mr. Larned regards railroads as the most perfect form of conveyance, where the traffic will justify the outlay of capital on them. Steam locomotives for other traffic on common roads is quite feasible, and no doubt Mr. Fisher's plan is the best now before the public. It cannot, however, be regarded as perfect. Steam-carriages are likely to be useful as tenders to railroads and steamboats. In Massachusetts, the multiplying of branch roads led to failure. There was not traffic to sustain them—but steam-carriages would, in such instances, be useful. The level bed-road will improve all means of travel. Yet we cannot expect perfect roads. We will never attain thirty miles an hour, except by automatic steering—for one second's looking round and neglecting his steering, would throw steersman, carriage and all into the ditch. With a locomotive fire engine, he got fourteen miles an hour easily—the engine weighing from 12,000 to 13,000 lbs., the steam being 180 lbs. pressure on the inch, the piston seven and one-half inches diameter, stroke fourteen inches, and the steam following two-thirds, he made eighteen miles an hour.

Mr. Fisher considered railroads a failure, as they do not, in general, pay dividends. Steam-carriages have not had a fair trial. They have not been fully tested yet, but will soon be in more general use.

The subjects selected for the next evening were, "Fire Escapes" and "Iron Buildings," after which the Association adjourned.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE, *April 13th*, 1860.

Professor Mason, Chairman. Benjamin Garvey, Secretary pro tem.

Mr. Bruce gave an account of Mono Lake, which is situated near the new silver mines in California. He had received a description of it from his sons, who reside in California. The lake is about six square miles in extent. It has no visible outlet, but the waters appear to flow from the circumference to the centre, and there to find a subterraneous outlet. One peculiarity of the water is, that it removes all corns and calosities from the feet of persons wading in it; and that it reduces the leather of boots to the consistence of wet brown paper.

The water is apparently strongly alkaline, as clothing may be washed in it by being simply rinsed. Some colors are discharged in the operation.

He had received by letter a specimen of a substance found on the surface of the lake in great abundance. This substance is gathered and stored by the Indians for food. It is composed of the nymphæ of a peculiar kind of fly, which is said to breed in the waters, and which is the only living thing known to exist in Mono Lake. It must be nutritive, for when *tried* out it yields seventy-five per cent of good burning oil. Thousands of tons of this substance can be collected every season, as the whole surface of the lake is covered with it, and the waters at the surface are thickened with it to the consistence of meal gruel.

Dr. Stevens had seen the specimen alluded to, and considered it the cast off cases of the nymphæ. The Digger Indians use it for food.

The alkaline properties of the water are doubtless due to the salts washed out of the shales, the same way as the salt lakes and valleys of the west are formed. The alkalies were originally derived from the ocean, and are washed back again from the land. When, therefore, there is a direct communication between any body of water and the ocean, provided that body of water be above the level of the ocean, the water is fresh. This is the case with the waters of the Onondaga Valley, which are two hundred feet above the level of the sea. Wherever salt wells have been sunk to the level of the sea the waters have become fresh.

Mr. Degroot and Dr. Trask say that the oil expressed from the substance from Mono Lake is an animal oil.

The Lake Mono lies due east of Marysville.

Mr. Whittemore stated that insects are used as food by Indians in Washington Territory. He has seen them so used on the sea coast, and between the Sierra Nevada and Shore Range.

Mr. Bruce mentioned, as a proof of there being an outlet from the center of the lake, that this substance floats towards the centre, even against the wind.

Mr. Garvey said, that if there were a constant current setting towards the center from all sides, there would be a whirlpool produced, by the combined action of the current and the earth's rotation.

Mr. Seeley, being asked if he had made a chemical analysis of the substance from Mono Lake—a small specimen of which had been given to him, for that purpose, by Mr. Bruce—stated, that he had not analyzed it, but, relying solely on the evidence of his senses, he would judge it to be a vegetable substance, and not an animal production.

Professor Hedrick stated that the specimen, which he had got, was too small for experiment. From the taste and smell, as well as the general appearance presented by it, he judged it to be a species of algæ peculiar to that lake.

Professor Mason announced that he had just been notified by the Secretary of the Committee on Arts and Science, that he was appointed Chairman of the Association, for the remainder of the year.

Mr. Bruce proposed that the Association express their approval of the nomination by vote. This proposition was carried by acclamation. A vote of thanks to the Chairman was then passed, for the punctual and impartial manner in which he had discharged the duties of his office during the past year, often at great personal inconvenience.

FIRE ESCAPES AND IRON BUILDINGS.

Mr. Dibbin, in introducing the subjects of the evening, suggested that: 1. There is too much wood used in buildings, which render them dangerously combustible. 2. Hooks and ladders are not now of as much use as they were when houses were only three stories high. 3. A greater quantity of fire-subduing and fire-escape apparatus is demanded by the wants of the inhabitants of cities, but these must not take up too much room. 4. In reference to the London fire-escape, which was attracting attention at the time, it would be well to examine its working and see if it is the best. True, houses in London allow more time for escape, and such an apparatus can then be fixed and used. It worked well when in operation, but it took up too much room. 5. There is a system of ladders proposed, which can be shot up to any reasonable height, but is also clumsy. 6. The canvas-bag escape may be used, but requires time for fixing. There is a ladder connected with it; the bag or hose arrangement being underneath the ladder. This worked well on exhibition; boys, children and goods, being slid down it with ease. 7. He would suggest the use of a pulley and rope, with a basket.

Dr. Young.—Women and children have not the skill necessary to use any of those fire escapes, nor even to come down ladders.

Ventilation being now called for, Prof. Mason remarked, that we commenced by warming with open fire-place and allowing the ventilation to take care of itself. This plan answered well while wood was abundant, and people lived in a mild climate. It has, however, been abandoned for the furnace, placed in the basement, and warming the air for the whole house. Of 5,000 houses in New York and Brooklyn which have furnaces, not one in 500 use the open fire grate. Fire-places are still made, but they are not necessary for ornament and they are not used.

Professor Hedrick.—The fire-place is not the best device either for heating or for ventilation, but it has been employed on the principle that "a half-loaf is better than no bread." Whirligigs in windows and other newfangled devices, are below contempt. The stove is still more defective. It enables us to use heated air to suffocation, but the open fire-place does not. There must be two systems of ventilation—one for winter, one for summer—and, to be thorough, they must be independent of us in their action, though under our control. Hot air tends to rise and will require a high chimney to give a draft.

Mr. Garbanati has his back parlor heated by a stove, his front one by an open fire, and he finds more suffocation in the back one. In England there are valves in the chimneys, near the top of the wall, which open when there is a pressure upon them from the room; but close, if the pressure is from the chimney. These facilitate ventilation and are the invention of Dr. Arnott.

Mr. Baker stated that the only heat from the open fire was the radiant heat, for the draft is directly from the inlet to the flue, and all the diffused heat escapes through the chimney. He proposed to create a draft in a ventilating flue by means of a steam pipe to heat the air and give it an ascending force. There ought to be some small vent towards the ceiling, to take away the carbonic acid.

Mr. Brown asked whether the gentleman would have a steam pipe in every ventilating flue in a schoolhouse, or would use one flue only for a ventilation in all cases.

Mr. Baker.—I would use a steam pipe in every flue where I want a draft.

Mr. Godwin.—That is an old idea.

Mr. Reed.—The mere fact of getting in cold air is not ventilation. We want an equal distribution of warm air with a sufficient change. The ancient Romans used a more scientific mode of heating. They introduced heat under a tile floor. This we cannot do because of our carpets. A platform of metal perforated with small holes can be used for all purposes. Apartments to be used as sitting or sleeping rooms, need no fire-place, but a warm supply of diffused air. Heated air if admitted in a heated column, rises to the top and does not diffuse itself, but if admitted in small jets it mixes with the air of the room equably.

Dr. Gould, in his experience, found that the nearer to the floor the fouler the air, hence people raise their beds above the level of the floor. For the same reason all air drawn from the cellar, and warmed, and sent into the apartments above, is foul and unhealthy.

Mr. Brown, by means of diagrams on the black-board, illustrated his mode of ventilation, namely, by letting in the warm air at the level of the floor at one side of the room, and letting off the foul air through a ventilating flue or flues at the other side, so that the warm air may ascend first and afterwards descend. Thus the purest air is found at the top of the room, and as it loses its temperature it descends until it finally escapes into the atmosphere through the ventilating flues. The room, then, is nothing more than an enlargement of the hot air flue. He gave some interesting statistics and experimental results which cannot be explained without illustrations.

Having resolved to continue the subjects "Ventilation and Iron Buildings," the Association adjourned.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE,
April 19*th*, 1860.

Professor Mason, Chairman. Benjamin Garvey, Secretary pro tem.

Mr. Fisher presented the committee's report on the amendment of the Patent Laws:

"The comittee appointed to consider the bill before Congress to amend the Patent Laws and to report whether it may be expedient for the American Institute to consider any points that may appear susceptible of further amendment, have carefully examined the bill, and respectfully report,

"That they cordially approve the section which authorizes the Commissioner of Patents to dispense with models, when, in his opinion, it can be done without disadvantage to the public; and the section which provides for the compulsory attendance of witnesses in cases of interference, and that which provides for a uniform rate of fees for citizens and aliens, and also the section which provides for a reduction of fees on filing caveats.

"In respect to section ten, which would narrow the field of evidence of priority of invention, your committee believe that further amendment, or the canceling of this section, is desirable.

"Your committee believe that a careful consideration of the improved systems of publication of England and France, will indicate a means of informing inventors, so as to prevent many of the interferences and rejections that now occur, under our present system of incomplete reports. The Astor Library has a set of printed specifications of English patents, from 1617 to 1858, presented by the British Government. Each patent is illustrated by one or more plates, sixteen by twenty-two inches. Some have three double-plates. These publications have all been made within a few years. There are indexes in separate volumes—a set of alphabetical, chronological and subject-matter indexes is published every year. The engravings are clear, and, with the specifications, which are printed in full, they will enable a good workman to construct the inventions, or an intelligent inventor to see whether his own device was similar. These books set in a row, side by side, would reach two hundred feet or more.

"There are also about 120 volumes, quarto, of *Brevets d'Inventions*—but the engravings are not so complete as those of the English office.

"The dependence on models, which has distinguished our office, has probably prevented it from making its reports at all comparable to the new reports referred to. The models have not been of use to the country, but only to the office, and of little use even there, as is evident from the reports of the Commissioner, and the provision in the bill to restore them, and to dispense with models in future. Comparing these evidences, which the inventors and manufacturers all over the country do not see, with the excellent engravings and printed specifications sold by the British Patent Office, your committee cannot but congratulate the country on the prospect of the abolition of the model system, and earnestly recommend that the Institute ask the attention of Congress to the improved mode of diffusing knowledge of patented inventions, with a view to its adoption, under such modifications as the circumstances of our county and the conditions of a self-sustaining patent office may render advisable.

"The published specifications of British patents are sold separately. They are sent gratuitously to the principal public libraries and institutions, at home and abroad. The titles of the specifications are printed on the covers, which are colored, and these covers are bound with the specifications. This affords an advantage to the patentees, who can purchase them to send to their customers. But the plates are large and costly, and are pasted on linen as a means to preserve them and to hold them in the volumes. Your committee believe that it is rarely desirable that plates should be larger than quarto size, say ten by fourteen. Such plates may be bound with the letter-press, will need no cloth to protect them, and may be folded to face each other. They should be issued in volumes of convenient size, bound plainly and durably.

"The cost of such a publication is to be considered. The settled policy of our government is to make the Patent Office pay its own expenses, and nothing more. Hence, patentees must in some way pay the cost of the publication. Whether they shall do it out of uniform fees, or pay according to the cost of printing their respective specifications, and have the fees low, is the final question. When it is considered that some specifications are short and require little or no illustration, it is evident that to charge uniform fees sufficiently high to pay for the work, would be taxing some for the benefit of others.

"The publication of specifications on the English plan, as soon as the patents issue, and the immediate transmission of copies to the public libraries and journals, would be an improvement on our incomplete system; but it would be better to publish a periodical record, divided into volumes for each class, so that they may be sold separately. In this record all specifications should be published, with sufficient illustrations, at the expense of the patentees, that is, the patentees should, prior to the issue of their respective patents, pay for the space occupied in the record by their specification, with the cost of engravings, etc.

"The books should be sold at such prices as would insure their extensive circulation. The Government should pay for as many copies as are required for the use of Congress, and for donation to public libraries, and for exchanges with Foreign offices which, like the English, publish their specifications. A complete set of foreign specifications should thus, if practicable, be procured for every public library, at the expense of Government.

"An advantage of requiring patentees to pay for printing their specifications is, that it would tend to induce their preparation in a clear and concise style.

"It may seem a hardship to poor inventors to require even the least expense that would record their inventions; and, further, that this system would give the rich an advantage over them, in that they might eclipse them by superior advertising. But it should be remembered that the rich now have this advantage in the various advertising chanels and the proposed publication would not increase it.

"The Committee, therefore, recommend that the American Institute memorialize Congress and pray for such a publication.

"In proposing to assess upon each patentee the entire cost of publishing his specification, which assessment is additional to the regular and uniform patent fee; and considering that the office will derive some revenue from the sale of these publications, already paid for by the patentees, it is to be expected that the regular fees will be reduced from time to time, so that the charge upon inventors shall not be of the nature of a tax.

"In respect to that part of the bill which provides for abolishing the right of inventors to appeal to a court outside of the Patent Office, your Committee recommend that the Institute should earnestly ask for its reconsideration. This right of appeal is an important check on the office, that tends to render its decisions more careful and just. But few of the deserving cases are appealed each year; and these appeals have a salutary influence. If this power is removed, and the office made the absolute arbiter on all questions of patents, your Committee apprehend that great wrongs will result.

"In respect to the foregoing, your Committee unanimously agree. And the majority of the Committee further suggest:

"1. That forasmuch as the books which the patentees have paid for may, if well written and illustrated, be sold to a great extent, the Commissioner should have power to distribute the proceeds of sales; and, as an encouragement to make the book interesting and saleable, the distribution might be in proportion to the literary and artistic value of the articles.

"2. That nations should recognize and protect each other's patents, and that a conditional provision to this effect should be suggested as an amendment to the bill.

"Respectfully submitted,

"J. K. FISHER,
"JOHN JOHNSON,
"T. D. STETSON,
"*Committee.*"

Mr. Howe said that the provision of the bill referring to priority of invention had been struck out. In his practice he has found an absolute necessity for power of compulsory attendance of witness in cases of interference. It is much wanted. It is not quite so easy a matter to charge for publication according to importance or length of specification. The dispensing with models is an excellent idea. They are useless. Drawings fulfill all conditions essential to the identification of the invention. Models should be dispensed with at the discretion of the Commissioner. On an average they cost $25, which is a heavy useless tax on inventors. This money could better be expended in getting up engravings and printed reports as in England. The English reports, though elaborate, are got out much earlier than ours. Some of those for 1859 are now in our Patent Office, while ours are only down for 1858, and are wretched at that.

Mr. Fisher.—The space occupied by engravings and printed matter could be charged for as advertisements are.

Mr. Dibbin thought it impracticable to have an international reciprocity of patents, as the first *applicant* gets the patent in England, whereas the first *inventor* gets it here.

Mr. Garbanati.—There ought to be a uniform charge, which would be moderate, and embody the same idea as a uniform rate of postage, for complicated inventions are, as a general thing, made by poor men, who could not pay the heavy charges that would come from discriminating between inventions.

Mr. Garvey stated that in the early patent laws of England the object was to introduce methods of manufacture and machinery new to the people of England, so as to promote domestic manufactures and industry. Therefore, whoever divulged a manufacturing secret, was guaranteed the exclusive right to it for twenty-one years. But the necessity for that policy has passed away, and now the practice of the English Patent Office is very similar to the practice of ours—the original first inventor is preferred and gets the patent.

Mr. Fisher showed that all the difficulties likely to occur from difference of practice in the different Patent Offices are already met, and are now satisfactorily settled in courts of law. By having an advertising tax, absurd fellows would be compelled to limit their specifications, or pay a heavy tax. To shew the worthlessness of the present Patent Office reports, he read some claims from "The Railway Review," which were exact copies, four of them occupying only four inches, and conveying no valuable nformation. Our reports are not fit to be produced in a court of law; the English are. Inventors have a right to see the whole specification, and not to be led into a waste of time and money.

Mr. Garbanati alluded to the absurdity of destroying models of rejected cases, or of requiring a model before the patent was agreed to be granted.

The Chairman.—There is a tendency to use drawings alone, to the exclusion of models. And all things tend to bring about an international copyright. Yet different nations take different views of the value of inventor's labors. In France it is deemed best to give the inventor a premium for his invention, and leave the invention open to the public. Belgium tends to the same practice.

Dr. Stevens moved that the whole matter be referred to the Committee on Science and Arts. This motion was carried.

Mr. Brown being called upon, explained a neat model of his hot water apparatus, for warming buildings. The air is heated by coming in contact with the surfaces of cast iron pipes, moderately heated with water, which circulates through them from a boiler, to which it returns after parting with its heat. There is ample provision made to prevent the generation of steam, and hence to prevent the possibility of explosion. The air too cannot be heated so as to endanger the building by communicating fire to woodwork. The model was much admired, and the system of warming was spoken of by several members as being highly satisfactory in practice.

The subject of the evening was then called for, when Mr. Ayres came forward and stated that as the evening was so far spent, if the Association would appoint the same subject for next evening, he would come prepared to read a paper on the subject. This suggestion being approved of, "Iron Buildings" was selected as the subject for the next evening.

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE,
April 26th, 1860.

Mr. Bruce, Chairman pro tem. Benjamin Garvey, Secretary pro tem.

During the time for miscellaneous business, Mr. H. B. Brown exhibited his school apparatus for teaching reading, spelling, composition, grammar, etc. It consisted of a frame with vertical wires, upon which were strung series of cubes with letters, numerals and words, so arranged that any number, word or ordinary sentence, may be formed or represented by them. On the four first wires the cubes had drawings of familiar objects upon them so that the picture might be shown, then the word representing the same idea. The word thus shown could then have adjuncts applied to the number of four, and four sentences also could be formed by the aid of verbs on the following cube, without changing the noun or adjective.

Mr. Godwin, in commenting upon it, instanced the mode of spelling by dictation, practised in the public schools, as an exercise well calculated to teach spelling, composition, etc.

Mr. Garvey gave an account of the mode of training teachers at the Boro' Road Normal School, in London. He mentioned the object lessons of Pestalozzi, and the constant repetition introduced by Jacotot, and concluded by giving it as the result of his experience acquired during ten years, that no apparatus can supply the place of a well educated, energetic teacher, who apportions his studies and recitations so as to accomplish something—no matter how little—every hour, and insists upon everything being thoroughly done.

Mr. Seeley considered that there was no advantage in new methods. The old plan of learning A, B, C, at the knees of the school marm was the best. It is of advantage to learn what A is of itself—to know that the letter is A. Phonography in schools is useless—it is absurd. In the days of his boyhood there were as good classical scholars made by the old method, as are now made by any method.

Mr. Garbanati exhibited a furniture caster, the invention of Mr. Fry, of Brooklyn. It is a valuable, though simple improvement on the old form.

Mr. Howe considered it very valuable and useful.

The subject of the evening being called for, Mr. Ayres read the following paper on

IRON BUILDINGS.

"Iron buildings belong to the nineteenth century. The increase of material wealth, the stores accumulated by modern commerce, demanded that greater care than had been deemed necessary or imperative, should be called into action, for their preservation. The vast losses which had been in times past incurred through the agency of fire, and the hourly dangers which beset the wealth and the art treasures of the world, called forth the invention of men to provide some means of safety. In cities especially, where, with an increase of population there was a corresponding decrease of ground-room, the old building materials, stone, brick and timber, were found to be no effectual guards against fire; for, although a fire-proof building could be made of stone, brick and mortar, such buildings would necessarily be limited in size, and exceedingly expensive where ground room was scarce. When iron began to be abundant, it would seem that toward the employment of it as a building material, at least so far as the beams and interior supports of warehouses were concerned, the mind of the architect and the mechanic would immediately have inclined. Iron did indeed claim some consideration, and received a little; but it grew very slowly in favor. In the early part of the present century a stout-hearted weaver attempted to build his house in part of iron, using the columns as main supports at once of the floors and of his machines; but, so far as we know, his project was abandoned. A warehouse on one of the wharves in Liverpool, erected somewhere between 1840 and 1850, had columns of iron to support the interior floors. Iron beams began to come in use in England; but their introduction was checked by some accidents which occurred on account of improper construction. Popular prejudice, ever alive to battle against the introduction of anything new and beneficial, was heightened by these accidents. Scientific men, with their eyes upon the stars, or walking amid the sea's dim lighted halls, busily investigating the laws which govern the earthquake and the storm, and the forces which first threw and then kept rolling in space the witnesses of the being and power of the Almighty—too much engrossed to give the matter any of their valuable time—nodded to the multitude, who thereupon shouted the louder their disapprobation.

"Whether an absolute necessity for the introduction of a new material for building existed, is hard to say. This much we are warranted, by subsequent experience, in assuming, that there was room in abundance for such. Prior to 1847, there was not in existence an iron house—beside the two instances alluded to, there had been constructed in England some soldier's barracks, made of sheet iron, nailed upon wooden standards. In our own city the use of cast-iron for building purposes was limited to the occasional substitution of a water-pipe, or a rude, solid pillar, for the ordinary stone posts of the first story.

"It was then that, on the corner of Center and Duane Streets, in this city, the first cast-iron edifice ever built, was erected. Mr. Bogardus' mind had been dwelling on the subject for years, and had finally so elaborated it, that in May, 1848, he commenced the iron-building which, amid prejudice, sneers and prophecies, he finally finished in the following year. Men came in flocks to laugh at what they facetiously christened "Bogardus' Folly;" and their prophecies were of a character which we are sorry to hear repeated in part, even after absolute success has rendered them absurd. One would not live in it, for the gift of the whole concern, for it would crush itself by its own weight; another, because it offered such an excellent mark for a thunderbolt; a third, it was not perpendicular, and would roll over some fine day: and a fourth, because, in case of fire, there'd be a grand chance for some melted iron. In their mind's eye, some men, saw the walls shrinking and shivering in the cold, and on a warm summer's day stretching themselves indefinitely, with an epicurean appetite to enjoy all the sunshine they could steal. But somehow the building was finished, and there it stood, while frost and fire were busily crackling and splintering the marble and free-stone, bidding defiance to fire and storm, until, to the lasting disgrace of the city of New York, it was removed during last year, at the bidding of the corporate authorities. To-day the iron building lies upon the ground, as perfect in preservation as upon the day it first stood a complete edifice upon the site it occupied.

"But let it not be supposed that safety and utility alone were the objects Mr. Bogardus had in view. Convinced himself that iron was capable of reproducing in at least equal amount and facility, all the triumphs of an old world art, he has succeeded in convincing others by occular demonstration, of the same truths, There never was a decoration, a deep undercutting, or ornament of any kind, chiseled or molded, which cannot be re-produced in iron, and the cast shall surpass the work of the chisel. To convince himself of this, and that many effects may be produced in iron which are impossible in stone, the stone-worker need only take some fine work of Sir Francis Chantry, for instance, and attempt to imitate. The cheapness with which architectural ornaments can be produced in iron, is self-evident. On the same building a number of similar ornaments are needed. Before the stone cutter is fairly at his work, the Corinthian columns are ready in iron, and before he has quarried the stone, the whole building is erected. Surely this facility need not alarm a generation who have, with singular equanimity and self-satisfaction, gazed all their lives long upon the blank walls that, until lately, and too much now, graced, or disgraced, all our avenues. Nothing should be tedious but uniformity, and that uniformity most which presents no uneven surfaces or relief. One mountain or hill is very much like another, the size being disregarded; yet we never tire of mountain scenery, while we wander listlessly enough over the prairies, the first day's travel being over. There is not so much danger of uniformity or reduplication in iron as in stone, because the artist knows the plastic power he has over his material. In this, as in every other case, we must throw ourselves into the hands of the experienced, and only be careful to avoid empirics.

"If I seem to dwell too long upon this subject, let the cause excuse me. It has been objected that great architectural results cannot be gained in iron; and, moreover, that we shall be loaded down with too many houses that bear a resemblance. Now let it be assumed that we have the old models—these we can imitate, and bo imitate—yet it is something new under the sun to object to them. If an iron house, constructed after a classic model, replace a blank brick wall, with square holes in it for people to look out of, or tumble out of, shall our architect complain? Shall any body complain? I can see no ground for dissatisfaction on the part of any one, except that he did not make the innovation.

"One effect the introduction of iron for building purposes undoubtedly had, and that was to rouse the community from their long neglect of all architectural beauty of design in both public and private buildings. As soon as it became evident that the new iron buildings would break away from the old straight up and down walls, the architects had to bestir themselves with their marble and free-stone. And a generous emulation has produced for our city and our whole country more architectural display during the ten years last past, than during the two centuries that preceded."

MODE OF ERECTION,

"The mode of constructing iron buildings, as patented by Mr. Bogardus, is simple and effective. The exterior framework of iron may be divided into two portions; for convenience of reference, columns and cornices. The cornice is cast in sections of convenient length, and the ends of these sections having been properly faced and planed, are brought together and bolted with one or more bolts. Beneath the joint thus formed, is placed the top of the cast iron column, which, by means of flanges, is bolted securely to the cornice, through each of the two sections of the same and the column of the story above rests directly over this joint and is bolted similarly at its base. This is repeated throughout the building, wherever the cornices and columns are brought together. The arches are bolted together in the same simple manner, and the spaces between columns filled up to suit the taste and style of architecture. All the parts should be well painted, as, by this means, the joints will be beyond any doubt air and water-tight.

"It will be seen that by a proper proportioning of the iron, a wall of enormous strength and solidity is erected—a wall, in fact, equivalent to one continuous piece of cast-iron. The height may be indefinitely increased.

Many of the columns may be removed without injury to the remainder of the structure, which, if several stories in height, will stand firmly upon the four corner columns, or other equivalent in relativo position.

"To sum up the advantages of iron buildings, which have been rather alluded to than urged upon your attention, I would direct you to consider:

"1. The great facility with which any architectural design may be carried out in iron.

"2. The great economy of space that may, if necessary, be obtained—inasmuch as a much thinner wall of iron may be made stronger than any stone wall now constructed. I do not mean to enter into any consideration of figures, for the reason that you are all familiar with them, and I hold a suggestion, which you can each elaborate, contains more force than any array of numbers—but it may not readily occur to you that a cast-iron column, made of iron of only ordinary hardness, would rise to the height of several miles, before its own weight would crush it. And this leads me to another point which I wish to impress upon you, namely, that with such enormous strength, there need only be employed skill and knowledge in the construction, to render an ordinary iron building, beyond all comparison, the strongest that can be made.

"3. Economy in the construction of foundations, usually so expensive a part of the builder's work; and the safety of the building, notwithstanding the foundation may be imperfect. I would not have you imagine that I would either advocate or countenance carelessness; but every man is aware how many unlooked for casualties happen to a foundation, often disastrous in their results to the superstructure. The advantage gained by the use of iron for the building in this regard lies herein, that if part of the foundation, notwithstanding all care used, shall give way, the superstructure will be still unharmed.

"4. A not unimportant consideration for New Yorkers is, if at any time the owner wish to move his building, he may do so, being only at the expense of the actual removal, and having his entire house in as good condition as when first made, losing nothing of the material.

"5. Security against lightning. The electricity being diffused over a large surface, thus loses all its intensity.

"6. Facility of ventilation.

"7. The impervious nature of the material preventing dampness and mildew, and consequently decay.

"8. Its durability, outlasting all the stone that ever was quarried.

"Lastly. Its incombustibility. All public buildings, and such private buildings as are used for the storage of valuable goods, or works of art, should have the interior at least constructed with a view to the prevention of fires. Without the aid of iron this is impossible."

Mr. Johnson inquired as to the effect of expansion and contraction of the iron?

Mr. Ayres replied that in all Mr. Bogardus' experience with iron buildings, it was found to be practically unimportant.

Mr. Whetmore instanced some buildings with iron fronts in Chicago, out of which the fronts fell bodily.

Mr. Garbanati stated that the general idea that a fire-proof building could prevent its contents burning, was absurd. We may preserve the shell, but the contents will burn out.

Mr. Ayres, in illustration of this, stated that an iron house in San Francisco had its contents burned out, but not a bolt of itself was disturbed, nor could the firemen pull it down. It had to be taken down piece by piece.

Mr. Reed mentioned that there was an iron light-house, 16 or 18 feet square, constructed on the wharf at Glasgow, and described in the *Mechanics' Magazine* for 1824.

Mr. Johnson stated that Fairbank constructed a mill of sheet iron for Egypt in 1834, and that he had seen a gas-house in London made of iron, before any iron buildings were put up here.

Mr. Godwin instanced the columns used in Regent's street, London, as specimens of early adaptation of iron to architectural purposes. These columns when taken down in London were imported into New York. He also stated that John L. Mott had used building blocks made of iron.

Mr. Garbanati instanced Vauxhall and Southwark bridges, London, as specimens of iron building, erected before he was born.

Mr. Howe called attention to the fact that iron is not the only building material which expands and contracts. Brick walls buckle and spring in consequence of expansion.

Mr. Baker considered that there was no instance of an iron building standing after its contents had been burned out.

Dr. Young.—The fire might burn out the contents of one floor without injuring the structure; though cast-iron on cooling suddenly, becomes brittle and unreliable as a material for lintels and beams.

Mr. Johnson.—In 1822, the original gas-holders or tanks were built of cast-iron, and it is well known that wrought iron has been used for architectural ornamentation for hundreds of years.

Mr. Seeley.—In considering the subject of building materials, expansion is the most important scientific point to be attended to. A piece of iron a thousand feet in length expands and contracts, say, one inch, with the changes of atmospheric temperature; and the force with which it expands is irresistable. All materials expand with heat. Professor Horsefield, at the Bunker Hill Monument, found the expansion of the materials of the monument sufficient to disturb his pendulum experiment. The expansion and construction in tubular bridges is calculated and allowed for. The statement made "that rails are laid abutting one against another," is manifestly wrong. Their expansion would cause them to twist and bend. When some have been so laid, they have buckled up in the middle.

Mr. Garvey called attention to the expansion of wood and other materials by hygrometric moisture, which he regarded as vastly more in amount than any expansion likely to occur in iron. He also mentioned the fact that iron is best adapted for the architecture of the present day; when glass can be employed to any extent, and the opening of buildings can be made large, giving the vivifying influence of light and air within buildings.

After some desultory remarks upon the expansion of metals, wood-work, etc., in which the compensation pendulum, wooden pendulum, steel rods, etc., were canvassed by Dr. Vanderweyde and Messrs. Howe, Seeley, Johnson and Garvey, Mr. Haskell obtained the floor and explained the nature of India rubber paint, its mode of application, and the excellent qualities it possesses for protecting iron buildings and tin roofs. The form of roofing material which he exhibited was admirable, and the paint was regarded by all present as an excellent article.

The subject selected for the next evening was "Expansion by Heat."

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